RAILROAD GAZETTE

FRIDAY, MAY 23, 1902.

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Contributions

Specified Loadings for Railroad Bridges.

Chicago, Milwaukee & St. Paul Railway Co.,
Chicago, May 14, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The table prepared by Mr. Ward Baldwin, M. Am. Soc. C. E., and printed in the *Railroad Gazette* of May 2nd, shows the loading used in proportioning the bridges built by the Chicago, Milwaukee & St. Paul up to about a little over a year ago. At that time our loading was changed to Cooper's Class E 50, which comprises two 177.5 ton locomotives, followed by a uniform train load of 5,000 lbs. The alternative loading is two loads of 65,000 lbs., on axles spaced 7 ft. apart. On our Superior Division, where there is an ore traffic, the bridges are being proportioned for the above load, or a uniform live load of 7,000 lbs. per lineal foot of track.

C. F. LOWETH,
Engineer and Superintendent B. & B.

Scale and Cold Washing.

Central of Georgia Railway Company,
Savannah, Ga., May 13, 1902.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I send you by mail a sample of scale removed from the crown sheet of a locomotive. The fire-box in this locomotive is over 15 years old. No doubt, there are many samples of scale equal in thickness to the one I send

you, but my object is to explain what we believe to be the cause of such a formation. About 18 months, or two years ago, we decided to experiment by cooling the boilers before washing them, as we believed the heat in the boiler, after discharging the water, baked the mud, which adhered to the surface, thus forming scale. Circulating the water, and gradually cooling the boiler, prevents scale forming, as proved after 12 months, by removing a flue showing no scale. Our process is to connect the cold water, fill the boiler full, then open the discharge at the blow-off cock, allowing it to run out as fast as it enters the boiler; the circulation of the cold water reduces the temperature below the point that would affect the soft mud, when the plugs are removed and the boiler washed out. It requires more time to clean boilers in this way, but the prevention of scale and the saving from the effects of sudden and irregular contraction, we believe justifies the practice.

Very truly yours,
THEO. D. KLINE, *General Superintendent.*

[The specimen of scale referred to, measures 1 in. thick, and on the faces which have been polished, it is a very pretty agate.—EDITOR.]

Maximum Moments and Wheel Loads.

A problem constantly occurring in practice is the determination of the greatest possible moment which can be produced in a beam by the combined action of a given system of wheel loads and a uniformly distributed load which covers the beam from end to end. The approximate solutions commonly employed are usually sufficiently exact for practical purposes. However, if an exact solution is desired the computer may be surprised at the evasiveness of tangible results, and will find when he turns to his book of reference for aid that this particular problem has been omitted. The moments produced by wheel loads alone or by uniform loads alone are fully discussed in many books and papers and need no further notice. The following demonstrations will be confined to problems in which the combined loading is used.

I. A beam is loaded from end to end with a uniformly distributed load and in addition a shifting wheel load. Required the position of the wheel load when the maximum moment obtains at a given point (Fig. 1).

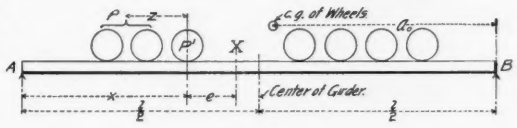


Fig. 1.

Let G = the total wheel load.
W = wl = the total uniform load.
l = the span.
x = distance of point of maximum moment from A.
P^1 = first wheel upon the left of X.
P = all wheel loads at the left of P^1.
z = distance of c.g. of P from P^1.
e = distance from P^1 to X.
a_o = distance of c.g. of all wheels from B.

Then

$$R_1 = \frac{2\,G\,a_o + W\,l}{2\,l}$$

$$M_x = \frac{2\,G\,a_o + W\,l}{2\,l}\,x - \frac{w\,x^2}{2} - P\,z - (P + P^1)\,e$$

$$\frac{d\,M_x}{d\,a} = \frac{G}{l}\,x - (P + P^1) = 0$$

or

$$\frac{G}{l} = \frac{P + P^1}{x}$$

now

$$\frac{W}{l} = \frac{w\,x}{x} \quad \therefore \quad \frac{G + W}{l} = \frac{P + P^1 + w\,x}{x}$$

This equality may be expressed in words as follows: Criterion (a) *The maximum moment obtains at a given point when the average load from the support up to this point equals the average load upon the beam.*

This criterion being true for any point it must be true for the point where the greatest possible moment obtains.

II. A beam is loaded from end to end with a uniformly distributed load and in addition a wheel load is so placed that a maximum moment is produced in the beam. Required the position of the point of maximum moment. Using the nomenclature given above and letting x_o = the distance of the c.g. of the combined loads from B,

$$R_1 = \frac{W + G}{l}\,x_o$$

$$M_x = \frac{G + W}{l}\,x_o\,x - \frac{w\,x^2}{2} - P\,z - (P + P^1)\,e$$

$$\frac{d\,M_x}{d\,x} = \frac{G + W}{l}\,x_o - w\,x - (P + P^1) = 0$$

or

$$\frac{G + W}{l} = \frac{P + P^1 + w\,x}{x_o}$$

From criterion (a)

$$\frac{G + W}{l} = \frac{P + P^1 + w\,x}{x}$$

hence

$$x_o = x$$

This expressed in words is criterion (b). *The center of the beam lies midway between the point of maximum moment and the center of gravity of the entire load on the beam.*

This being true for any point of maximum moment it will be true for the point of the greatest possible moment.

Criterion (a) may be satisfied in two ways with the combined loading. The moment may be assumed to be under the wheel P^1 when $\frac{P + P^1 + w\,x}{x} \geq \frac{W + G}{l}$ and $\frac{P + w\,x}{x} < \frac{W + G}{l}$, assuming the wheel P^1 to be divided into two parts nP^1 and $(1-n)\,P^1$ so that $\frac{P + n\,P^1 + w\,x}{x} = \frac{W + G}{l}$: Or, x may be found by making $\frac{P + P^1 + w\,x}{x} = \frac{G + W}{l}$ giving $x = \frac{P + P^1}{G}\,l$. In either case, if criterion (b) is satisfied a maximum moment will obtain which of these moments is the greater can be found by trial. Usually it is the one under P^1.

III. A beam is loaded from end to end with a uniformly distributed load, and in addition a shifting wheel load is so placed that the greatest moment obtains under a wheel P^1 according to criterions (a) and (b). Required the position of this wheel. (Fig. 2).

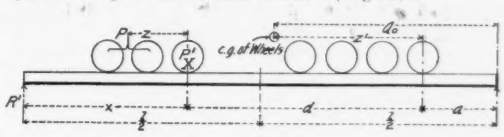


Fig. 2.

$$R_1 = \frac{G\,a_o}{l} + \frac{W}{2}$$

$$M_x = \frac{G\,a_o}{l}\,x + \frac{W}{2}\,x - \frac{w\,x^2}{2} - P\,z$$

$$a_o = z^1 + a = z^1 + l - d - x = D - x$$

hence

$$M_x = \frac{G\,D}{l}\,x - \frac{G\,x^2}{l} + \frac{W}{2}\,x - \frac{w\,x^2}{2} - P\,z$$

Placing $\frac{d\,M_x}{d\,x} = 0$

$$x = \frac{2\,G\,D + W\,l}{4\,G + 2\,W} = \frac{l}{2} - \frac{G}{2\,G + W}\,(d - z^1)$$

By criterion (b)

$$x_o = x = \frac{l}{2} - \frac{G}{2\,G + W}\,(d - z^1)$$

Thus the position of the wheel load is very quickly obtained. The value of M_x readily reduces to

$$M_x = \frac{2\,G + W}{2\,l}\,x^2 - P\,z$$

This expression gives the greatest possible moment which can occur under a wheel.

IIIa. Let the expression $\frac{P + P^1 + w\,x}{x} = \frac{G + W}{l}$ be exactly satisfied or $x = \frac{P + P^1}{G}\,l$ then

$$x_o = x = \frac{P + P^1}{G}\,l$$

To locate the position of the wheel load

$$(W + G)\,x_o = G\,a_o + \frac{W\,l}{2}$$

or

$$a_o = x_o - \frac{W\,(l - 2\,x_o)}{2\,G}$$

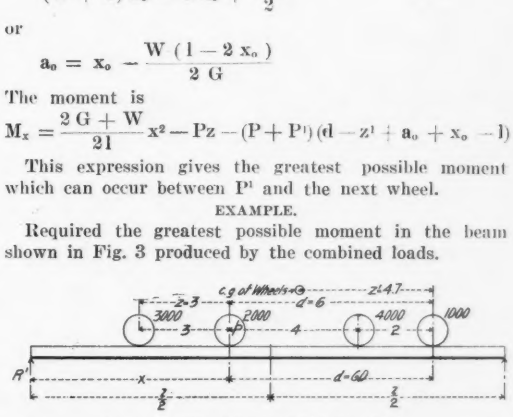
The moment is

$$M_x = \frac{2\,G + W}{2\,l}\,x^2 - P\,z - (P + P^1)\,(d - z^1 + a_o + x_o - l).$$

This expression gives the greatest possible moment which can occur between P^1 and the next wheel.

EXAMPLE.

Required the greatest possible moment in the beam shown in Fig. 3 produced by the combined loads.



G = 10,000, W = 10,000, l = 20.

Fig. 3.

Let the moment be assumed to fall under a wheel. From experience with wheel loads alone the wheel P^1 will probably be that wheel nearest the c.g. of the wheel load. In this case the 2,000 wheel.

$$x = x_o = \frac{l}{2} - \frac{G}{2\,G + W}\,(d - z^1) = 10 - 0.4333 = 9.5666$$

and

$$M_{x = 9.5666} = \frac{2\,G + W}{2\,l}\,x^2 - P\,z = 59640.$$

If wheel 4,000 is taken M_x = 59100 a moment slightly smaller.

Let

$$x = \frac{P + P^1}{G}\,l = 10 = x_o$$

Then

$$a_o = x_o - \frac{W\,(l - 2\,x_o)}{2\,G} = 10. - 0 = 10$$ or the point of maximum moment, the c.g. of the entire load and the center of the girder coincide.

$M_{x = x_o} = 59500$ which is a very little less than the moment found under wheel 2,000. In one case the wheel P^1 is 0.4333 from the center of the beam and in the other 1.3.

If instead of a shifting wheel load a fixed wheel load is assumed in combination with a uniform load the determination of maximum moments presents some interesting features. Retaining the nomenclature employed above let the maximum moment between one end of the beam and the first wheel be required. (Fig. 4.)

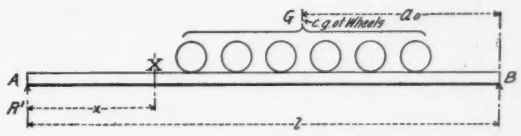


Fig. 4.

$$R_1 = \frac{G\,a_o}{l} + \frac{W}{2}$$

$$M_x = \left(\frac{G\,a_o}{l} + \frac{W}{2}\right) x - \frac{w\,x^2}{2}$$

$$\frac{d\,M_x}{d\,x} = \frac{G\,a_o}{l} + \frac{W}{2} - w\,x = 0$$

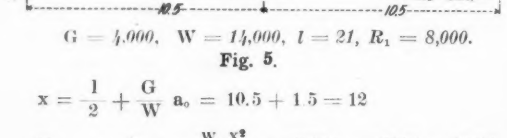
or

$$x = \frac{2\,G\,a_o + W\,l}{2\,W} = \frac{l}{2} + \frac{G}{W}\,a_o$$

which indicates that there will be *no maximum moment between A and the first wheel unless this wheel is beyond the center of the beam a distance greater than* $\frac{G}{W}\,a_o$

EXAMPLE.

Maximum moment between first wheel and center of girder. (Fig. 5.)



$G = 4{,}000,\ W = 14{,}000,\ l = 21,\ R_1 = 8{,}000.$

Fig. 5.

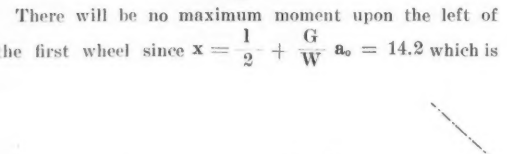
$$x = \frac{l}{2} + \frac{G}{W}\,a_o = 10.5 + 1.5 = 12$$

$$M_{x\,=\,12} = R_1\,x - \frac{w\,x^2}{2} = 96000 - 48000 = 48000.$$

The moment under the first wheel is 46,300, which is less than the moment obtained above. Hence 48,000 is the maximum moment for this loading.

EXAMPLE.

Maximum moment under a wheel. (Fig. 6.)



$G = 4{,}000,\ W = 7{,}300,\ l = 21,\ R_1 = 4{,}940.$

Fig. 6.

There will be no maximum moment upon the left of the first wheel since $x = \frac{l}{2} + \frac{G}{W}\,a_o = 14.2$ which is greater than the distance of the first wheel from the left support.

$$M_{x\,=\,13.5} = 36000.$$

There remains one other condition to consider, namely, will there be a maximum moment between wheels. Let x be the distance from P^1 to the point of maximum moment beyond P^1, required the value of x. (Fig. 7.)

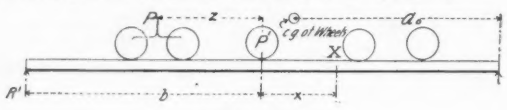


Fig. 7.

$$R_1 = \frac{G\,a_o}{l} + \frac{W}{2}$$

$$M_x = \left\{\frac{G\,a_o}{l} + \frac{W}{2}\right\}(b+x) - \frac{w\,(b+x)^2}{2} - P\,z - (P+P^1)\,x$$

Placing

$$\frac{d\,M_x}{d\,x} = o$$

$$x = \frac{2\,G\,a_o + W\,l - 4\,W\,b - (P+P^1)\,2\,l}{4\,W}$$

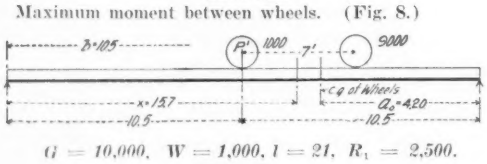
or

$$x = \frac{l}{4} + \frac{G\,a_o - (P+P^1)\,l}{2\,W} - b$$

Whenever the value of x is greater than the distance from P^1 to the next wheel there will be no maximum moment between these wheels.

EXAMPLE.

Maximum moment between wheels. (Fig. 8.)



$G = 10{,}000,\ W = 1{,}000,\ l = 21,\ R_1 = 2{,}500.$

Fig. 8.

$$x = \frac{l}{4} + \frac{G\,a_o - (P+P^1)\,l}{2\,W} - b = 5.2 \therefore x + b = 15.7$$

$$M_{x\,=\,15.7} = 22300.$$

The moment under P^1 is 21,000, which is less than that between the wheels.

In case there is a large number of wheels a very few trials will determine if there are maximum moments between wheels, and then the moments under the wheels may be examined. This problem is at once solved graphically by drawing an equilibrium polygon for the uniform load below a horizontal line and an equilibrium polygon for the wheel loads above this line. The point of maximum moment can be found by inspection.

Exhaust and Draught in Locomotives.

GENERAL CONCLUSIONS OF THE INTERNATIONAL RAILWAY CONGRESS.

A number of months ago we printed some of the information on this subject brought before the Congress by its reporters. The conclusions have, within a few weeks, been made available. Reporters were, for the United States, Mr. C. H. Quereau, then Master Mechanic, Denver & Rio Grande; for Sweden, Norway, Denmark and Russia, Mr. B. O. Ekman, Assistant Locomotive Superintendent, Swedish State Railroads; for other countries, Mr. Edward Sauvage, Assistant Chief Engineer Motive Power Department, Western Railroads of France.

In presenting the reports and conducting the discussion before the Congress, Mr. Sauvage took the leading part, and the effort was to reconcile and harmonize the conclusions of the three different Reporters, and present, if possible, a definite statement which should apply to locomotives in all countries.

Mr. A. W. Gibbs, of the Pennsylvania Railroad, was present and assisted in explaining some things about American practice which did not appear to be generally understood by the Congress. After an interesting discussion, extending over two days, and which is worth careful reading, the Congress arrived at the following conclusions, which were adopted as resolutions.

Conclusions.

"1. No general rule to decide on the choice between a fixed and variable blast can be laid down. This choice should take into account whether the locomotive does uniform or irregular work, the profile of the lines run over, the loads drawn, the length of run between stops, the kind of fuel used, the cost of maintenance of the apparatus, and the care and skill of the staff.

"2. The simple circular fixed blast and the variable blast fitted with two flap valves appear to satisfy most of the requirements met with in practice.

"3. More complicated arrangements, such as the blast fitted with petticoat above it, the deflector plate fixed in the smoke-box, the annular blast either fixed or variable, the variable blast with sliding sleeve, by-pass for a portion of the steam, etc., may give good results, but do not as a rule appear to show any great superiority over the two simple forms mentioned above, provided that the latter are suitably arranged.

"Blast pipes are subject to rapid incrustation with dirt, which makes the maintenance of complex mechanism difficult; this incrustation is frequently unequal in the case of annular blasts.

"4. The dimensions of the blast pipe and of the chimney and also the position of the blast pipe may be determined by certain formulae, but it is advisable to verify the results by actual experiments on each class of locomotive; practical tests alone form the real criterion.

"5. When the blast opens into the upper portion of the smoke-box, as is generally the case throughout Europe, it appears advisable not to raise the opening much above the upper row of tubes.

"When the blast is in the lower portion of the smoke-box it should be fitted with a petticoat. It does not appear that this arrangement which, moreover, possesses some disadvantages, shows any great superiority over others.

"It is of great importance to provide a large and easy entry for the gases into the lower end of the chimney. There is a general tendency to somewhat increase the opening by making the upper portion of the chimney conical.

"6. The length of smoke-box may attain and even exceed 6 ft. 6¾ in. without producing an unfavorable effect on the draught. Large smoke-boxes may serve as a receptacle for cinders; the chimney should then be placed sufficiently far back; but it is advisable, when no deflector plate is used, to place the chimney sufficiently far from the tube plate to ensure equal distribution of the gases throughout the tubes. When it is not desired to catch the cinders in the smoke-box, the length may be reduced to about 4 ft. 11 in. in accordance with recent American practice.

"7. Spark arresting devices are rarely very efficient without impeding the draught. It is therefore advisable to use these appliances as little as possible, and to simplify them to as great an extent as the quality of the fuel and the character of the country run through may permit.

"8. Of all apparatus intended to utilize the waste heat of the exhaust steam, the exhaust steam injector is the only one which is found frequently in use; this apparatus appears to ensure some small economy in fuel, and to result in easier steaming."

Allegheny River Bridge and Track Elevation at Pittsburgh.

[WITH AN INSET.]

It is well-known that for some time, the Pennsylvania System has been elevating tracks in Pittsburgh and building a new union station. This has involved a large amount of additional and contributory work, including the construction of a new double-deck, lattice girder bridge over the Allegheny River.

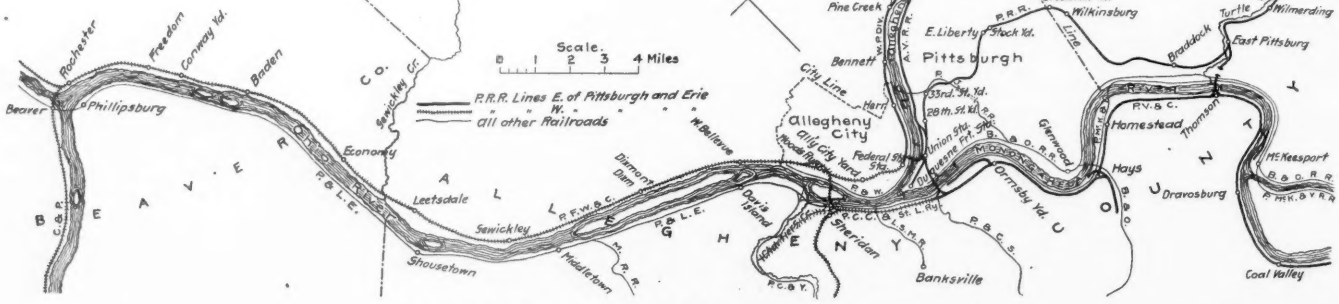
It is interesting that this latter structure together with the track elevation in the city of Allegheny should be the outcome of work done in Pittsburgh where it has been independently agitated at different times since 1886. The first plans prepared covered the separation of grades at Anderson, Sandusky and Federal streets and Marion avenue, and did not contemplate the rebuilding of the bridge across the Allegheny River between Pittsburgh and Allegheny. On account of not being able to come to an agreement as to division of cost of the work it was postponed.

Early in 1900 it was decided to build a new Union Station at Pittsburgh, practically on the site of the old station, and in connection with this work it was decided to elevate the structure so that the tracks of the Pittsburgh, Fort Wayne & Chicago should be carried over grade at Liberty street, Eleventh street and Penn avenue, the streets being depressed about two feet. On account of the location of the local freight stations of the Pennsylvania Lines between Penn avenue and the river, also on account of a connection with the Allegheny Valley Railroad, at the Pittsburgh end of the Allegheny River Bridge, it was decided best to erect a double-deck bridge over the river, all through passenger and freight business of the Fort Wayne road being carried on the upper deck, and the Pittsburgh local freight of the Pennsylvania Lines, and the transfers to and from the Allegheny Valley Railroad, being carried on the lower deck. The distance between the grades from the upper deck to the lower deck is 20 ft. 3 in. There are two tracks on the upper deck and two on the lower deck, but the construction of the bridge is such that a third track can be added to either or both levels by making changes in the floor system. The new bridge consists of five spans, of which four are about 160 ft., and one span about 340 ft. center to center of piers. The position of the new piers is substantially the same as occupied by the old ones, with the exception that one pier in the channel is to be removed.

On account of rebuilding the masonry in this location it was necessary to move the old bridge down stream 23 ft., temporary supports being built for this purpose. It was expected that all the work on this bridge would be completed by Jan. 1, 1902, but owing to the inability of the contractors for the superstructure to furnish the material in time, the erection work had to be postponed until this year; and it was necessary to remove some of the temporary piers and put the remaining temporary piers in condition to withstand the spring freshets and ice.

The masonry of the old bridge was built about 1854, and a wooden bridge was placed thereon, opened for travel in 1858. The wooden bridge was replaced by an iron bridge in 1865 and 1867. This consists of five lattice double-track spans about 160 ft. each, with plate girder spans at both ends. This bridge was light for the heavy traffic and it would have been necessary to replace it independently of the track elevation.

The new bridge being much heavier than the old bridge and there being a necessity for relocating some of the piers to be parallel with the current it was decided that all the masonry should be rebuilt. Open cribs were



The Pittsburgh Terminals of the Pennsylvania System.
(The line south of Chartiers Creek is now building.)

constructed having bottoms consisting of from five to eight thicknesses of timber. These were towed into place and sunk into position by building new masonry inside the open cribs. The depths to which these cribs were sunk varied from 13 ft. to 25 ft. below the level of the pool. On account of the Davis Island Dam, which is located about 5.4 miles below Pittsburgh, there was practically no current, so that these cribs were floated and landed into position without difficulty. The foundations were dredged out to the proper depth and it was first intended that the cribs should be landed on the hard gravel bottom of the river, but in landing the first crib we found that some rip rap from old piers had washed into the space to be occupied by the new foundation, and after two unsuccessful efforts to get the crib level it was decided to make a bottom bed of concrete, which was accomplished by means of clam shell buckets discharging concrete into the bottom of the river. This method was followed on all the other piers, and after its adoption there were no other difficulties encountered.

As already noted the position of the new bridge is to be the same as that occupied by the old, so that the removal of the latter became a necessity. As it was desired to maintain traffic over the line during the construction, the old bridge was moved down stream 23 ft. and there carried on temporary piers.

The five spans of 160 ft. each were moved simultaneously. The work was started at 6 o'clock on the morning of Sunday, April 13. The bridge was then run as single-track until 8:25. The time between these two intervals was utilized in taking out the blocking under the south track, and also in moving the same on the approach, as the bridge was to be moved southerly down stream. The blocking on the piers under the south part of the structure was all removed by the time the transportation department was ready to give up both tracks. Immediately after 8:25, track No. 1 was cut apart at both ends, the blocking was removed, and by 8:35 everything was ready to move the bridge. The interval from the time when the actual moving was begun until the bridge was in its final location was 4 hours and 25 minutes. Of this period, 21 minutes was occupied in the actual moving and the rest in the delays incident to the carrying on of the work.

At two in the afternoon the south, or No. 2 track, was connected at both ends and the structure was again operated as a single-track bridge. At 3:30 p.m. both tracks had been connected at both ends, and it was once more available for use as a double-track bridge. Traffic was interrupted from 8:25 a.m. to 2 p.m., 5 hours and 35 minutes, and the time consumed in doing all of the work was just nine hours.

The bridge was moved by jacking it up and carrying the ends of the spans on rollers running on rails laid on the piers and cribwork, and without breaking the rail connection across the bridge itself. The power required for the moving was furnished by three hoisting engines connected with the different sections of the structure. One was placed at the Pittsburgh end, one at Allegheny, and the third was on top of the central span.

While the work was in progress, passenger trains were diverted over the Panhandle road and the Ohio connecting bridge, but freight trains were held back until the moving was completed. The first train to reach the bridge in its new position was a heavy freight from the Pittsburgh yards which crossed at 3:25 p.m., after which the traffic was carried on without interruption.

The essential features of the bridge are shown in the cross-sections and side elevation and plans. In Allegheny, from Anderson street westwardly, the railroad passes over Anderson, Sandusky and Federal streets. From Federal street to Ridge avenue the grade is descending westerly, and at Marion avenue the new elevation is to be 7 ft. above that of the present. One-half of the street will be depressed making a subway beneath the tracks. The work now under contract and in progress stops at Ridge avenue, where the old level of tracks is attained. In the next section of work, which under contract with the City of Allegheny is to be commenced within two years, the tracks will be lowered, the maximum depression being about 16 ft. at North avenue and Pennsylvania avenue. The streets at these places will be raised sufficiently to go over the railroad at its new level. At Washington avenue the railroad will be depressed about 3.5 ft. and the street at the railroad crossing raised 16.5 ft., making an overhead crossing.

The tracks after crossing the bridge to the Pittsburgh side of the river drop on a descending grade of a little less than .50 per cent. to connect with the yards and tracks of the Union Station.

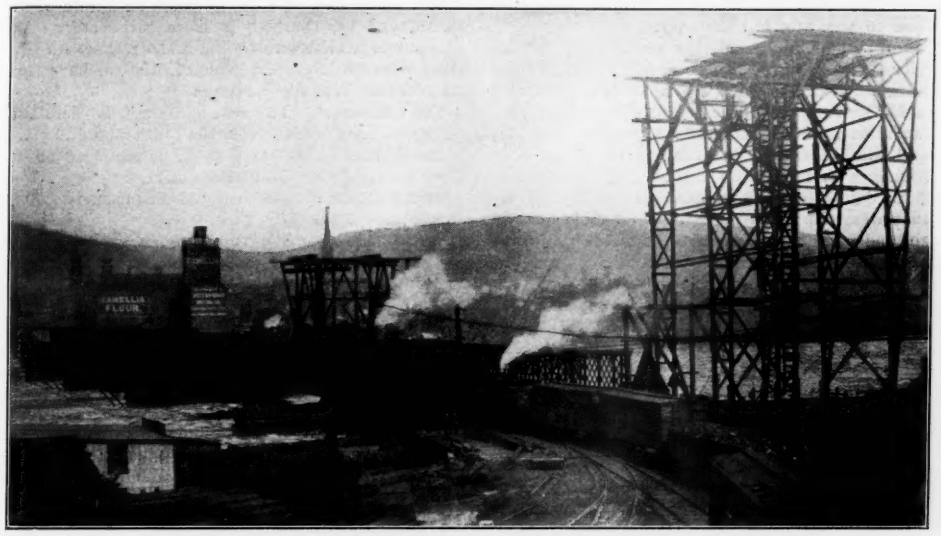


Fig. 1.

Allegheny River Bridge—Looking Toward Allegheny.

Fig. 2.

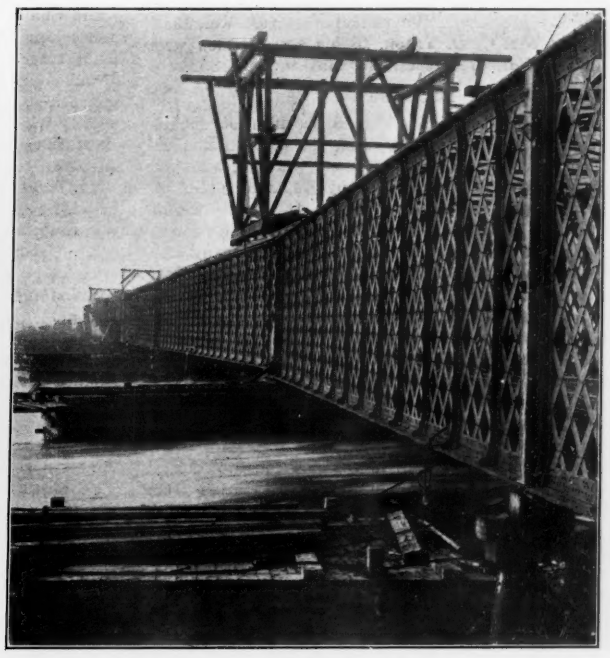


Fig. 3.

Allegheny River Bridge at Pittsburgh—Pittsburgh, Fort Wayne & Chicago Railway.

As in every other piece of work of this character there have been many emergencies and many details to be worked out and decided, as the work progressed.

The accompanying engravings, reproduced from photographs, show to a certain extent the methods that have been followed. The cribwork at the south side of the piers for the temporary support of the old bridge with the rails for carrying it to its new resting place are shown in Figs. 1 and 3, while from Fig. 2 a good idea can be gained of the false work erected at each side of the piers and which served to carry the structure while the blocking was being placed beneath the ends. These are, of course, the main features of the work and, aside from the actual operation of moving, are those of the greatest interest to the engineer.

Additional Hearing on the Metric System.

The Committee on Coinage, Weights and Measures of the House of Representatives has issued a pamphlet report of the supplemental hearing on the metric system held on April 24, at which Lord Kelvin and Mr. George Westinghouse were present by invitation during the recent visit of Lord Kelvin to Mr. Westinghouse at Washington.

Lord Kelvin was asked to give his views as to the desirability and practicability of a universal system of weights and measures; if practicable what system he advocated; if the metric system what advantages and disadvantages will come from its adoption. In reply Lord Kelvin spoke of the obvious advantages of a universal system which he, of course, strongly advocated. He said if no system existed it might be considered what would be the best foundation for a general system, but this question the French philosophers and statesmen took under effective guardianship more than one hundred years ago, and with great wisdom chose a system that is almost ideally perfect. Lord Kelvin described in considerable detail the advantages of the metric system which he said should be called the "French metrical system," comparing it with the American and English system, "or rather a metrical jumble," to the disadvantage of the latter. He said that American and English workmen are constantly hampered by their use of the inch and spoke of the inconvenience of using some fractions of an inch, American workmen, notwithstanding their intelligence, finding such fractions as seventeen sixty-fourths very awkward. The American and British measures of bulk and area cannot be called a system, hardly even a jumble of systems.

After speaking of many kinds of weights and measures in use here and in England and of how few people could tell off-hand how many square feet or square yards are contained, for instance, in an acre, Lord Kelvin said that nothing can be more convenient than the French metric system for any kind of business and science, there being no case, large or small, in respect to measurements where the French metric system is not satisfactory.

He considered it a wise provision of the bill under discussion that the Government should first adopt the system and thought that while there would be some inconvenience at first, a week or two would suffice to get over the inconvenience caused by the tendency to work to even sizes; that no useful machinery would be displaced and that the first fortnight will more than compensate by the ease and simplicity of the metric system for any inconvenience. American and English electrical workmen all use it now, but also have to work in feet and inches, every instrument-making shop in England being forced to use two standards.

Lord Kelvin said that if America decides to make the reform and adopt the metric system, England will follow very quickly, and while he would prefer to see

England lead he would be glad to see America lead if the end can thus be accomplished sooner.

In reply to a suggestion by Mr. Westinghouse that nearly all of our drawings are in eighths, sixteenths, etc., making it hard to scale with fifths, tenths, etc., Lord Kelvin said there will be some inconvenience where there is a large amount of accurate drawing.

Mr. Westinghouse said that in the Westinghouse Electric & Mfg. Co. the enormous stock of drawings were all made in these irregular measurements, but that it was only a question of development and in five or ten years the inconvenience of the change would disappear, and that his company is now doing considerable work on the metric system.

In reply to a question as to whether he was opposed to the metric system Mr. Westinghouse said that on the contrary if America is looking forward to capturing the commerce of the world, many of our products must be made according to the French measurements; that it seems that ultimately one system will be universally adopted; it is only a question of the manner of requiring it that is involved, and more can be accomplished by gentle pressure than by proceeding swiftly. Every man in the United States is busy making things and they are making them according to drawings on the old system. It will not be convenient in a day, a month or even in a year to change all these drawings. The system once decided upon the new designs could be made on it and finally we would work over to it. Nothing but good could come from the passage of the bill; the real question is with reference to the time element. The fact that the Government adopts it as standard will have more to do with the question than any other. It is question of changing the habits and methods of the people.

In reply to a question as to what extent it is true that the principal machine shops throughout the country are now prepared to furnish their products in metric measurements, Mr. Westinghouse said that all, he thought, would undertake the contract and it would be a question of drawings. One question is that of maintaining old sizes and patterns with old dimensions for repair work, so that those having their engines can get any parts necessary to fit easily; the difficulty is of keeping drawings with reference to past work. With reference to new things the metric system will be a convenience and not a hardship; it is only the things that have been constructed and are fixed that are concerned.

Railway Signaling Club.

The regular meeting of the Railway Signaling Club was held at Chicago, May 13. President C. C. Rosenberg (L. V.) presided. The principal subject was that presented by Mr. C. O. Tilton, in his paper which was given in the *Railroad Gazette* of May 9, page 352.

DISCUSSION.

Mr. Elliott (C., M. & St. P.): A specification should give as much information regarding the construction as the railroad regards essential to good practice, and yet allow leeway to the signal company so as to admit of the use of apparatus made by them. It is the custom on the C., M. & St. P. to draw up a plan of the interlocking and submit this plan to the signal company and ask for their bid, submitting our own specifications. We aim to number the levers; to show the distances of the derails, switches and signals, and to give the exact location of the tower.

Mr. Gillingham (Hall Signal Co.): The club should get up specifications which will meet general practice and invite all the roads to adhere to them. The several railroad companies are as far apart on their specifications as they were five years ago.

Mr. Hope (C., St. P., M. & O.): I found it necessary a few days ago to borrow some information from another road. I wanted a joint building; a depot with an interlocking tower. I got a plan from the Chesapeake & Ohio. I think it would be well for this Signal Club to get up some standard drawings; it would be appreciated by many roads.

Mr. Elliott: I don't like to discourage discussion, but it seems to me that it would be a great mistake to attempt to have a single specification for all roads. It would stop advancement. The specification, if adopted, should be adopted for a given length of time. The Milwaukee road has just gotten out a new specification, in which almost every drawing is different from the one that was made four years ago. We might well adopt standards for certain parts; we are all using joists of a certain size; compensators and compensator bases; turnbuckles that are all interchangeable; we are using other parts that can just as well be made standard and kept in stock by the signal companies. If the approval of the Club could be put upon the parts that are now in common use other men could manufacture them.

The Chairman: A plan was submitted to me a few days ago, where a street railway crosses our line. There were two estimates made, by two signal companies; one used a five-lever machine, while the other needed ten. There is evidently some discrepancy between the views of the two parties. How can you operate two derails in a paved street—with the detector bars, and six signals, with five levers? There was only about $90 difference between the two bids. We should come to an understanding as to what function or functions a lever is to perform. For instance, is it wise to use selectors? Is it wise to put two switch and lock movements with the necessary detector bars on one lever? Is it good practice at a grade crossing, double-track in both directions, to clear both homes on one line with the same lever?

Mr. Christofferson (C. G. W.): I have a printed specification, and if I want to vary from this specification I state that in a letter; otherwise follow the specification. I think my specification is very complete, and I get very close bids.

Mr. Dunham (Illinois Central): We submit a drawing which provides for all distances, etc., and say ten levers for ten signals; five levers for five switches or three switches, as the case may be, and so on; with our specifications there is very little room for any misunderstanding. At any rate, we have very seldom been called upon to pay any bill for extras.

Mr. Elliott: I am informed that one railroad is contracting for five plants and has no specification. It has a signal inspector employed in the road department. I asked the bidder if in his bid he proposed to furnish concrete foundations, iron signal poles and other improvements, and was informed: "Oh, no, it would never do to let them get hold of those things." It has become necessary in double-tracking to move practically all the towers that were put in on the St. Paul road about ten years ago, and in nearly all of these instances the tower might just as well have been put 22 ft. back from the main line at first.

Mr. Dunham: Our company has been constructing a good many miles of second main track within the last few years, and we have run over a great many crossings that had been interlocked, but we have not in any case found it necessary to move any of the signal towers, neither have we found it necessary to increase the size of the machines.

Mr. Christofferson: On a single track road that is likely to be double-tracked within a short time, it is wise to provide for the second track. While I have done so for years, I have found that in a number of cases the second track went on the other side of where I had provided for it.

Mr. Camp: I notice that the members don't take very well to this suggestion of Mr. Tilton's to use the expression "interlocking station." He ought to have called it a tower. Is it advisable to try to change the names of these things in interlocking that have become well established? The world over it is called a "tower" or a "cabin."

Mr. Christofferson: I believe interlocking station is the proper term, for the machine is not always in a cabin. It is often put in a station. We have a number of those cases on the Chicago Great Western.

Mr. Elliott: The term "interlocking station" is certainly consistent, but I am afraid it is going to be very hard to make a change.

The Chairman: In the East it is hard to place your interlocking station back far enough to allow for an additional track. Some railroads don't even own the right of way of the track, let alone any right of way for an interlocking station. There are other objections, especially where two roads parallel each other. I know of six stations where the interlocking plant of one road is placed on the ground of another road, and *vice versa*.

Mr. Hope: I move that the Club adopt the term "interlocking station" to correspond with the American Railway Association.

Mr. Goodman (C., C., C. & St. L.): I have a little objection: We have just gotten up a new set of specifications and we have used the word "cabin" all the way through. The motion was put and lost.

The next paragraph considered was the proposition that "in numbering up a plan, the levers should be grouped for each road, as this saves walking on the part of the signalman."

Mr. Christofferson: We have been doing this in our towers the last six or seven years. While in a large tower it should always be done, I find it undesirable in a small tower, on account of the lead out, though where you are using the rocker shaft lead out it is immaterial.

Mr. Elliott: The question resolves itself into a matter of expense. How much money are we willing to expend to save walking on the part of an operator? In a long machine it may mean the difference of one man in the handling of the levers. Whether it will pay could only be settled by figuring out what the lead out would be under the two different arrangements. Where there are three or four parallel tracks of as many roads, or tracks crossing each other, it seems to me that it would be worth the expense of arranging the levers for each track together in a group so that the man will not have to be running up and down his machine each time that he wants to change from one line to another.

Mr. Pflasterer (C. & E. I.): What is the objection to a rocker shaft lead-out?

Mr. Christofferson: It is very expensive; and we always get more or less lost motion, which we don't get in a crank.

Mr. Pflasterer: We use rocker shafts altogether, wherever possible. We find them in every case to be more satisfactory than a crank lead-out. We don't load our levers so heavily as to cause lost motion.

Mr. Elliott: There are some levers you can't help loading up; the function is so far from the tower; and it has been our experience that a rocker shaft has a great deal more lost motion. One of the leading signal foremen in this country, working for a signal company, says that if he had his way he would never use a rocking shaft for anything.

Mr. Goodman: We have abolished the rocking shafts entirely.

The members being asked as to their practice in regard to grouping levers, replied as follows:

Mr. Elliott: We group them according to the track, though where there are a large number of switches it is almost impossible to group them for each track. We can then group them for each road. In the majority of cases we group the levers for the individual track.

Mr. Dunham: We are grouping levers with the larger machines. It saves a lot of running about on the part of the towerman, and enables him to do his work quicker. There is not the same objection that there formerly was when most of the signals were wire-connected.

Mr. Goodman: We group levers on plants of over 20 levers, and we consider it more satisfactory. A plant was put in service on our line a short time ago in which there were 56 levers not grouped, and we have met with many kicks from the operators.

The Chairman: The next paragraph is "derails should be put at least 500 ft. from the fouling point," etc.

Mr. Elliott: We use 500 ft. as standard on the St. Paul road, on our main line tracks.

Mr. Dunham: The required distance is 500 ft. in this State (Illinois).

Mr. Goodman: We run through several States but we make an arbitrary distance of 500 ft.

Mr. Hope: What is the proper length of a guard rail, if 500 ft. is the distance of the derail, where the grade is level.

Mr. Christofferson: A majority of the signal engineers all through the country make it 150 ft. We have adopted that for our standard.

Mr. Elliott: We are using 150 ft. of guard rail.

Mr. Wileman: Will it not pay to place the derail even more than 500 ft., carry a guard rail on either side and fill it with gravel or sand and avoid the upsetting of trains; and yet get a stop before coming to a crossing?

Mr. Cade: You can't tell what an engine is going to do if it goes off a rail. I have seen an engine, going very slowly, spread itself over four tracks; and I have heard of other cases where cars got off the track, going 50 miles an hour, and got on again without doing any damage at all.

Mr. Camp: I believe you ought to have a guard rail about 400 ft. long. If it is a fact that an engine won't run more than 500 ft. over the ties why not keep it on the ties instead of leaving any chance for it to go into the ditch?

Mr. Elliott: In not more than four cases out of 100, unless there is some deflecting switch to throw it, will the engine leave the ties until it is almost at the crossing. I believe that a derailed engine, with derail 500 ft. from the crossing fouling point, will not get off of the ties very far until it gets almost to the crossing. Our practice has been to put the derails on the back up track from 200 to 225 ft. from the crossing. We have had several cases of derailments on crossings on back-up derails, owing to a train that had broken in two going over the crossing and the derail being opened by the towerman, not noticing that the rear car was not with the train and the man backing up going off the derail. With 30 or 40 cars backing up at ten miles an hour, 50 ft., I should say, would be rather short distance.

Mr. Christofferson (replying to question): We are using the lifting, known as the Wharton derail. We find it is the best thing in use. The Wharton derail projects above the rail an inch and a half. In the first place, I had an inch and seven-eighths, but I had them all planed down; I used one weight of derail, that is 60-lb. steel for everything. I used the same derail for different tracks by having a higher riser plate.

Mr. Elliott: A Wharton derail, if set to derail on the inside of a curve, will not act in all cases if the corner of the rail is worn at all. I know of a case on an 8-deg. curve where the derail is set to derail on the inside, and when the top corner of the derail gets worn so that the quarter inch radius is worn to about half an inch the derail doesn't act at all. The flange catches directly on the point and forces the derail open and the wheel of the engine continues on the track. In consequence of this we have found it necessary to renew the rails in the main track opposite the derail every six months, and that is very expensive. If the Wharton is on the straight track or the outside of the curve, we have found it to act in each case, but otherwise it does not.

Mr. Pflasterer: We have made the Wharton derail a standard for high speed routes and have adopted the Pennsylvania's plan of putting the inside point down on a level. We found two or three instances where there was very heavy rubbing on the rail when it extended above the tops of the main rail, and we had one, in fact, turn clear out of the track by something catching on it.

Mr. Jacobs: The Vandalia has used the Wharton derails for the last three or four years and we have had no trouble with them. We never have any trouble with them, and they don't cost very much.

The Chairman: The next paragraph is: "Concrete foundations."

Mr. Goodman: I use nothing else.

Mr. Elliott: We use concrete foundations; we also use iron anchor posts for our crank and compensator foundations. We use no top plate on which to put the compensator base. The use of cast-iron compensator posts saves about 50 per cent. over what each anchor bolt and cast-iron top piece underneath the compensator base costs.

Mr. Shaver: I am a believer in concrete foundations, but in the western country oak will last just as long as

concrete at less expense. We have a small plant in Colorado that has been in, I think, six years, and the original oak foundations are perfectly sound; climatic conditions have something to do with the condition.

Mr. Dunham: We have been using concrete foundations for a number of years, except for pipe carriers foundations, and within the last year or two we are also using them for that purpose. We are now using concrete foundations throughout.

Mr. Goodman: We use anchor bolts in large concrete foundations, but on repair work we use angle bars on the top of concrete foundations to put our cranks and compensators on.

Mr. Wileman: We use concrete foundations entirely; with cast legs for cranks and compensators.

Mr. Christofferson: We use concrete foundations for everything and an iron anchor sheet to fasten the bolt to. The only place where we use any oak top is on a crank foundation and on dwarf signals.

Mr. Pflasterer: We are using concrete foundations for pipe carriers; using casting for crank and compensator foundations, and some wood for dwarf signals.

Mr. Ralph (C., R. I & P.): We are using concrete pipe carrier foundation with oak top; also for compensators, cranks and wheels. It is often the case that you have got to put on a new oak top, and in trying to get off the nuts from the bolts that are concreted in the top you can't do it, and consequently your foundation is rendered useless.

Mr. Goodman: We only use one size foundation for pipe carriers. We use one foundation for up to four or five lines of pipe, and beyond that we use two of these foundations and put oak tops across. For cranks and compensators, we dig a hole and suspend this over the hole with anchor bolts below and fill in with concrete; 24 in. deep, 4 or 5 in. in diameter.

Mr. Pflasterer: We make all our pipe carrier foundations at one place and ship them out where we want them. All our other foundations we make on the ground where we are working, and the dimension of our pipe carrier foundation is 8 x 8 at the top and tapers to 10 x 10 at the bottom; 24 in. high.

The Chairman: The next paragraph deals with overloading of levers.

Mr. Elliott: Our practice is to put but one switch and lock movement on any lever. A switch and lock movement working a derail or a switch is sufficiently heavily loaded, and if it is necessary to have a facing point lock, that switch should have a separate lever. For a slip switch, I would have two for the four points at one end, one lever for the four movable point frogs, and two levers for the four detector bars.

The Chairman: The next paragraph is: "All derails, switches and home signals to be worked with pipe."

Mr. Pflasterer: That is our practice.

Mr. Christofferson: I have always been able to get the second position with wires as well as with pipe. If it is necessary to work a home signal with pipe, why isn't it necessary with a distant signal?

Mr. Dunham: I think we all agree that wire connections are troublesome. You certainly can't keep your plant in as nice working order.

Mr. Elliott: Wire signals have caused us a great deal of grief. For distant signals pipe is out of the question; it costs too much, a signal is too far away to operate a wire line successfully. I am going to use the automatic signal; that is the cheapest solution of the question. . . . It has been stated by members in the Club that they have worked switches as far as 2,300 ft.; if that is the case, you can use pipe for anything. An instance has been mentioned on the B. & O., if I remember rightly, where one switch and lock movement and one derail were worked 2,300 ft. from the tower.

Mr. Cade (replying to a question): The use of channel iron in England is not compulsory; some roads use channel iron and others use pipe. I think that the weight of channel iron is pretty nearly as heavy as pipe. I think that pipe is much better than channel iron. There is one question about pipe connecting signals, although they are used in England almost altogether; the difficulty of being sure that they will assume the danger position, if they become disconnected anywhere near the lever. There are very few pipe connected signals that are a reasonable distance away from the tower that will assume the danger position as they ought to do.

The Chairman: The next paragraph reads: "No selectors to be used and mechanical distant signals and dwarf signals to be worked by two lines of wire."

Mr. Goodman: We have abolished the use of selectors altogether, considering that they cost more than it does to build an additional lever.

Mr. Elliott: I differ on that question of cost. With pipe connected home signal and switch about 700 ft. from the tower, a selector would cost very little in comparison to an additional pipe line from the tower. Selectors should be as few as possible, but if it is going to cost $250 for additional pipe line from tower, I believe it is a good plan to use a selector, provided, however, that signals can be properly bolt locked. A selector can only be used in this case with one switch; never attempt to select between two switches.

Mr. Pflasterer: We have abolished the use of selectors on everything except two-armed dwarf signals.

The Chairman: The next subject is two-blade signals and the location of the same on the pole. [Mr. Tilton would put lower blade 10 ft. above track.]

Mr. Goodman: We are considering the advisability of making the second arm show at night purple instead of red; it seems to me that would do away with the necessity of changing the location of the second arm.

Mr. Wileman: I want to warn you against trying purple; you are going to get red every time.

Mr. Cade: One objection to having the blades far apart would be the difficulty of making it uniform. For instance, where we have two arm poles on a bridge you would hardly be likely to put the top blade 17 ft. above the bottom one. Exceptions would come creeping in that would make this scheme objectionable.

Mr. Elliott: Mr. Cade's point is well made; but it is certainly dangerous to put two lights on a high signal pole and have one of the routes unsafe for a train to run over at high speed. We have had several instances where one of the lights has gone out and the engineer has taken the indication of the clear light; it happened that the signal man had set up the wrong route, and the consequences were rather bad. With but one light on top of the pole there can be no mistake made if that light goes out. We blind the spectacle in the lower light. Again, it simplifies the view very much to put the arm lower. We have had a great many derailments by confusion of signals. By lowering the lower arm down to ten ft. above the rail there is no confusion. Another argument in favor of this arrangement is that with the use of the escapement crank for the lower arm you get very good results with a wire connected signal. On the North Western the second arm is put on a separate post (dwarf), but that makes two entirely separate signals.

Mr. Cade: There is no reason why the bottom blade should not be blinded even if they are only six ft. apart. And the escapement movement can be used just as well as if the blades are only six ft. apart. There are innumerable cases where you have bracket poles and signals on bridges, and they will occur so frequently that it seems to me that this having them that unusual distance apart will give a good deal of trouble. One objection to putting the dwarf signal at the bottom of the post is the fact that it is almost impossible to carry out the principle to any very great extent; there are bracket poles and bridges and lots of places where it cannot possibly be carried out.

A Diagnosis of M. C. B. Coupler Defects, Based on Results in Service.*

The Interstate Commerce Commission recently addressed a letter of inquiry concerning the operation of the safety appliance law to the general managers of different railroads. One of the questions asked is, Whether the application of automatic couplers has resulted in greater safety and economy in the operation of trains and in terminal switching. The answer to this would undoubtedly be a practically unanimous affirmative. It must be remembered when considering the defective and weak points of the M. C. B. coupler, which have been developed in service, that the coupler now in use does not differ in essential dimensions and strength from the original coupler designed for cars of about one-half of the capacity of those now being built. Furthermore, longer trains are being handled by the heavy engines, and the cars receive very severe service in switching and terminal yards. The fact that the element of personal danger has been largely eliminated by the automatic coupler is believed by the writer to be responsible to a great extent for the damage caused by rough switching.

In order to get facts showing the actual results obtained in service it will be necessary to present a few statistics concerning couplers and their performance. The C. B. & Q. compiles a monthly "break-in-two" statement, giving the number of trains parted and the defect of the coupler which caused the parting. A summary of these statements for the past three years is given herewith, as the figures will tend to show the comparative strength of the different parts of the coupler mechanism:

The foregoing table refers only to coupler failures on the road, and does not include failures or breakages in switching or terminal yards. The first part of the table gives the number of failures during the year due to the different causes, and what per cent. this number is of the total number of failures for the same period.

During the first half of the three years covered by these figures there were some link-and-pin couplers in service, and as it is impossible to separate the link-and-pin car mileage from the mileage of cars having automatic couplers, no attempt has been made to determine the number of car miles per failure for that period. The figures given, however, are for automatic coupler failures only; the link-and-pin failures were not considered.

The second part of the table is based on the results obtained after the link-and-pin coupler was abolished. In this section the number of "break-in-twos" due to the different causes during periods of six months and the number of car miles per failure are shown. These figures should be of value in considering the subject of couplers, as they show that certain forms of failures have increased very rapidly during the past year.

Particular attention is called to a few of the more important defects that are being observed in service. There appears to have been a decided decrease in the number of "break-in-twos" due to the lock working open. There were 37 "break-in-twos" attributed to this cause during the six months ending Nov. 30, 1900, with an average of 2,985,770 car miles per failure; during the next six months there were 24 "break-in-twos," with an average of 4,411,341 car miles per failure; while for the last six months there were 21 trains parted, with an average of 5,535,369 car miles per failure. One or two of the minor defects also show some improvement, but the lock working open is about the only important defect which is decreasing in frequency, while on the other hand there have been large increases from other causes, with a corresponding decrease in car mileage per "break-in-two." A good illustration of a defect which has increased very rapidly is to be found under the heading of "draw-bar lugs broken." This defect shows a decided increase during the second six months, while during the third six months the car mileage per "break-in-two" from this cause has decreased to less than half of what it was during the first six months. The number of "break-in-twos" due to knuckle failures and to defective pivot pins has also increased, but not as rapidly as that due to lug breakages.

As the preceding table does not account for yard failures, several scrap piles containing a total of 345 couplers were examined with the idea of determining the most common cause of removal, and the results are given herewith:

Record of Scrap Coupler Examination.

Defects.	Number.	Per cent.
Both lugs broken off	35	10.14
Bottom lug broken off	13	3.77
Top lug broken off	114	33.04
Broken guard arm	57	16.52
Broken through face	67	19.42
Broken through shank	34	9.85
Bent guard arm	18	5.23
Head broken off just back of bracket	3	.87
Head broken off front part	3	.87
Broken through key slot	1	.29
Total	345	100.00

These figures show that nearly one-half of the scrap couplers were condemned on account of broken lugs, and thereby confirm the other statistics, which indicate a very large increase in the number of lug failures. Further consideration reveals the fact that the breakage of top lugs constitutes over 70 per cent. of the total lug failures. The question which now presents itself is: "What causes the top lug to break more frequently than the bottom lug?"

The breaking of the pivot pin is one of the common forms of coupler failure, and it is believed that this is the cause of the majority of breakages of top lugs. It is found that the pin breaks at about the middle and the lower half drops out, putting all the strain on the top lug. In some instances the pin may have been bent, but not broken, although in such a case the bottom lug

COUPLER DEFECTS ON THE BURLINGTON.

Defects.	Year ending Nov. 30, 1899.		Year ending Nov. 30, 1900.		Year ending Nov. 30, 1901.		June 1, 1900, to Nov. 30, 1900.		Dec. 1, 1900, to May 31, 1901.		June 1, 1901, to Nov. 30, 1901.	
	No. of failures.	Per cent.	No. of failures.	Per cent.	No. of failures.	Per cent.	No. of failures.	Car miles per failure.	No. of failures.	Car miles per failure.	No. of failures.	Car miles per failure.
Lock pin defective	8	1.62	24	4.25	14	2.06	11	10,043,044	6	17,645,366	8	14,530,344
Lock worked open	132	26.84	101	17.91	45	6.61	37	2,985,770	24	4,411,341	21	5,535,369
Lock pin worn	16	3.25	13	2.31	3	.44	..	.....	1	105,872,206	2	58,121,377
Lock block defective	10	2.03	19	3.37	11	1.62	12	9,206,124	5	21,174,441	6	19,373,792
Lock block worn	5	1.01	2	.36	15	2.20	2	55,236,743	9	11,763,578	6	19,373,792
Lock block bolt bent	5	1.01	..	....	8	1.17	..	.....	4	26,468,051	4	29,060,688
Lock would not drop	6	1.22	..	....	1	.15	..	.....	1	105,872,206	..	.....
Knuckle defective	113	23.00	151	26.77	210	30.85	83	1,331,006	86	1,231,072	124	937,441
Knuckle worn	36	7.31	56	9.95	69	10.14	30	3,682,449	30	3,529,073	39	2,980,583
Wrong knuckle	4	.81	1	.18	6	.88	..	.....	5	21,174,441	1	116,242,754
Pivot pin defective	23	4.68	21	3.71	33	4.83	13	8,497,960	15	7,058,147	18	6,457,931
Drawbar lugs broken	40	8.12	40	7.09	78	11.45	22	5,021,522	31	3,415,232	47	2,473,250
No visible defects	42	8.54	62	11.00	84	12.33	31	3,563,660	44	2,406,186	40	2,906,070
Coupler body broken	24	4.88	40	7.09	63	9.25	26	4,248,980	25	4,234,890	38	3,059,020
Not specified	21	4.26	28	4.95	26	3.82	15	7,364,900	13	8,144,016	13	8,941,750
Foreign substance under lock	3	.61	..	....	1	.15	..	.....	..	.....	1	116,242,754
Too much play	4	.81	6	1.06	12	1.76	5	22,094,697	7	15,124,601	5	23,248,551
Miscellaneous	..	....	..	....	2	.29	..	.....	1	105,872,206	1	116,242,754
Total	492	100.00	564	100.00	681	100.00	287	384,925	307	344,860	374	310,809
Total freight car miles							110,473,486		105,872,206		116,242,754	

*Extracts from a paper presented before the May meeting of the Western Railway Club by R. D. Smith, Supt. M. P., B. & M. R. R. R.

or both lugs would be as liable to break as the top lug. This breakage of pivot pins has become so common, and the lower halves of the pins may be found to such an extent in any large freight yard, that it recalls the conditions existing when the old link-and-pin coupler was in service. It is not intended to convey the impression that the number of broken pins is as great now as it was with the link-and-pin coupler, but the number is increasing and is attracting attention.

It is believed that the statistics based upon the coupler failures upon the road do not show the true relation between pivot-pin failures and lug failures, as it is very probable that the broken pins are frequently lost, or if the pins are only bent they are not reported. The mechanical engineer of one road running into Chicago states that he believes that fully 90 per cent. of the lug breakages are preceded by bending or breakage of the pins. The representative of a large coupler concern also states that in his opinion the bending of the pins is responsible for some of the lug breakages. It is evident that the number of lug breakages is excessively large and that it is necessary to do something to obviate this condition. There does not appear to be any good reason why the pins and lugs cannot be strengthened enough to bring this form of failure down to a normal amount. Some of the coupler manufacturers have been trying to relieve the pin and lugs of part of the strain by putting a hook on the end of the knuckle projecting through a hole in the side of the coupler head, and some attempts have been made recently to increase the diameter of the pivot pin.

The M. C. B. specifications for couplers give the dimensions of pivot pins and require the material to be of steel, carefully annealed after forming. It is further specified that the holes in the lugs and knuckles be drilled or drifted to a diameter $^1/_{32}$-in. greater than that of the pivot pin, but an examination of several new couplers, of different manufacture, shows that this requirement has not been rigidly followed. In one new coupler the holes in the lugs and knuckle are $^3/_{32}$ in. larger than the pivot pin; in another new coupler the holes in the lugs are $^1/_{32}$ in. larger than the pivot pin, while the hole in the knuckle is $^5/_{64}$ in. larger. Several knuckles were also examined, and some of the holes were found to be elliptical and to contain sand, which proves that they had not been drilled or drifted out.

Inspectors should not accept couplers or knuckles which do not conform closely to the specifications. There is some tendency for the holes to wear elliptical, and if the pivot pin fits closely in the hole this tendency is somewhat diminished. There is also more opportunity for the pin to bend if it has very much clearance in the holes.

It might be productive of some improvement if the M. C. B. specifications recommended a certain composition for steel used in pivot pins. The chemical composition of the pins is not specified, and an analysis recently made of three different pivot pins revealed a great difference in composition.

Electric Power for Swiss Railroads.

Two months ago, an interesting study was published by L. Thormann, a Zurich engineer, on the possibilities of substituting electricity for steam on the Swiss railroads. The fact that Switzerland is dependent on foreign countries for coal has drawn attention to the great unemployed water power.

Mr. Thormann shows that it is quite possible to develop sufficient water power to operate all the Swiss railroads, but at the same time he shows that it is a mistake to believe that the expense of working would be decreased to any considerable extent. The cost of the transformation and reconstruction would be heavy, and an amortization of the invested capital would be impossible.

The five principal lines demand about 30,000 h.p. a day. To guarantee this, 60,000 h.p. of high tension alternating electric current would be required, to which the necessary reserve would have to be added. The question whether the available water power of the country would be capable of supplying this power is answered in the affirmative. Thormann names the following works, which are either in course of construction or designed:

Name of works.	Horse-power.	Name of works.	Horse-power.
Sihlwerk, near Einsiedeln	20,000	Lungernsee (Unterwalden)	2,000
Laufenburg on the Rhine	10,000	Montbovon (Vaud)	1,500
St. Maurice	5,000	Kander (Bernese Alps)	1,500
Wangen on the Aare	5,000	Sense (Fribourg)	1,500
Beznau on the Aare	5,000	Gurtnellen	1,500
Wäggithal (Schwyz)	5,000	Göschenen	1,500
Fribourg-Hauterive	4,000	Ritmosee	8,000
Rheinau	3,000	Giornico	4,000
Hagneck, near Biel	2,000	Marobbia	1,000
Doubs, near Puntrut	2,000	Verzasca	1,000
Vallorbe (Jura)	2,000	Total	86,000

The cost would be very great. The writer calculates it at $31,073,000, viz.: Rolling stock, $7,720,000; conducting cables and miscellaneous, $13,510,000; and commutator stations, $9,843,000. He shows that although the direct saving would not be important, the country would profit enormously, as the vast amount expended for coal would remain in the country. The general utilization of water power throughout the country would also mean a valuable encouragement for other industries.

Rowell-Potter Block Signals on the C., M. & St. P.

On Monday, May 19, the Chicago, Milwaukee & St. Paul put in use, on its Milwaukee Division, near Chicago, two block signal sections equipped with the Rowell-Potter Company's automatic block signals; and the signals are fitted with the "safety-stop" device of that company, by which the air-brakes of a train are automatically applied if the engineman neglects to stop at the stop signal. There are four signals in use; two for northbound movements and two for southbound. The track circuits and governing relays are arranged as in other automatic block signal systems, but the power for moving the signal arm is derived from a power-storing machine, consisting of a wheel and ratchet which winds up a series of flat coiled springs, the wheel being revolved by means of the long end of a lever, the short end of which extends beneath one of the rails of the track, so that the depression of the rail by the passage of cars and engines lifts the opposite end of the lever.

The general design of the apparatus is similar to that which has been used in other places by the Rowell-Potter people, but changes have been made in details. The valve for setting the brakes is fixed to the front truck of the tender, instead of being placed on the locomotive as formerly. There are two valves on the tender, one on each side, so that an engine can be run backward if necessary. The valves are enclosed in sheet-iron boxes, so that nothing but the safety-stop can touch them. All of the trains running over this section of the road will be governed by the block signals, but only four locomotives have as yet been equipped with the safety-stop connections.

About 200 ft. beyond the semaphore signal and its safety-stop track instrument, there is a second track instrument, connected with the first, and so arranged that when the first is in the stop position, the second is all-clear, and vice versa; so that if the first should fail to go to the stop position as the train passes it, the second one would remain in the stop position, and thus would automatically stop the train. The fact that the second one allows the train to pass gives assurance that the first has assumed the position necessary to protect the rear of the train.

Express and Light Freight Traffic on Electric Roads.

Within the last few years there has been a remarkable growth in the electric lines centering in and about Albany, New York. A circle with a radius of 15 miles and Albany as the center, includes a population approximately of 271,384, and the proximity of Troy, Schenectady, Cohoes and Hudson, besides numerous small towns, makes a considerable suburban business. This is a natural field for electric lines, and there is a growing demand for just the sort of service that they are best fitted to render, taking their passengers direct from the home or place of business in one city to the destination in another.

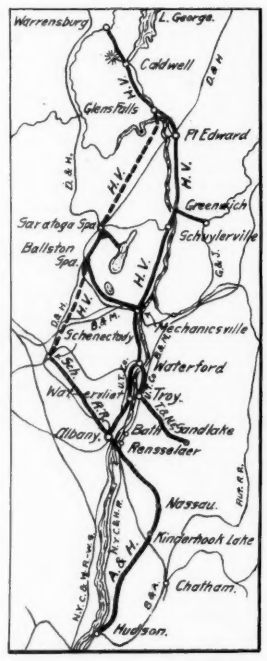
The companies in that local field are five. The United Traction Co., which operates all the lines within the city limits of Albany, and also in Troy, Rensselaer, Watervliet and Cohoes, with connecting lines, holds the key to the situation. The policy of the management, once the "five cities" were controlled, has been very thorough and conservative. Further extension and exploration is left to outside concerns, while the United Traction holds a monopoly of the termini, but grants trackage privileges freely, on a car-mile agreement. This is the opposite policy to that of the Everett-Moore syndicate, further west, and its soundness has been shown in the results of operation. North of Albany, the Hudson Valley line, which is rapidly adding to its mileage, extends to Glens Falls and Warrensburg, with branches to Ballston and Saratoga Spa, and to Greenwich, operating 103 miles of line, 80 of which is on private right of way. South, the Albany & Hudson Co., a consolidation of the Kinderhook & Hudson Railroad, with several traction lines, extends to Hudson, with a road 35 miles long on private right of way. West, there is a direct line to Schenectady, which runs along the highway, and will later serve as a link in the chain of electric roads which are being extended east and west from centers like Buffalo and Cleveland, until, before many years, it will be possible to travel from Albany to Chicago by electricity, if one desires to do so. Eastward from Albany there is a company which has as yet no trackage rights in the cities, but runs nine miles out from Albia, a suburb of Troy, to Averill Park and Sand Lake.

This completes the list of the electric lines centering at Albany and Troy. On each of these express matter and light freight, as well as passengers, are carried, and on all but one of the lines, this kind of traffic has already become profitable. The exception is the Troy & New England Co., previously mentioned as running east from Troy. Having no trackage rights into town, and reaching no places of importance on its run, the Troy & New England finds that the haul in wagons from Troy to Albia, a distance of about four miles, eats up the profits of an express business which is done at a charge of 10 cents per 100 lbs. transported.

The system varies on the other lines, but is in each case profitable, even where it has only been in working order for a few months—the Schenectady line was opened for express business last January. On the Albany & Hudson line, the express goods are carried in a compartment which occupies approximately a third of one of the long passenger cars, being about 18 ft. long. Two express trips are made daily in each direction, under contract to the American Express Co., which originates and delivers the goods, using the Albany & Hudson line just as it would use any steam railroad, and charging its regular rates to customers. A large car, shown herewith, was built experimentally for express service only, but is not at present needed in that capacity. It is now serving as an electrical locomotive, and on one occasion hauled a train of eight loaded and 17 empty box cars around a reverse curve in the Rensselaer yard.

Ordinary freight to the amount of 27,249 tons was carried on this line during the year, of which the greater proportion—12,287 tons—was coal and coke. General merchandise to the extent of 7,657 tons was also hauled, and 1,556 tons of lumber. With the exception of a short stretch of grade, which is now worked by steam in making a connection, this entire traffic is moved by electricity, and the express cars serve as locomotives. There is only one steam train running, and it is planned shortly to have an electric locomotive built for this work. The express service on the Albany & Hudson, therefore, presents only the novelty that the motive power is electricity, instead of steam, since in other respects it is like that on the steam roads working in similar territory.

A company known as the Electric Express takes charge of this branch of the business on the Schenectady line, and on the "five cities" lines of the United Traction Co. The car illustrated is of the characteristic type used about town, carrying express matter only. Collections and deliveries are made by private wagons, which contract to perform this service for the company at the rate of 20 per cent. of the gross express charge, at each end. The goods are brought to a terminal station in Albany which is situated on State street, between Broadway and the river. Formerly, this station held two cars; its capacity is now being doubled, but although this is not yet completed, the congestion on State street caused by cars waiting their turn is increasing day by day, on account of the large business which is being built up, and it is only a question of time when more commodious quarters must be provided. The present system of making collections and deliveries by private wagons on a generous percentage, has the advantage that it frees the company from expense and responsibility when traffic is light, particularly at small points along the route. But it seems evident that the development of the business will sooner or later make it profitable for the company to use its own teams, at least at terminals like Albany and Schenectady. The low rate of 10 cents per hundred lbs. for all points reached is charged on express matter by this company also. Their current advertisement, reproduced below, shows clearly the nature and scope of the business.



Map Showing Electric Lines Centering at Albany, N. Y.

ELECTRIC EXPRESS.

Goods called for and delivered to Albany, Troy, Watervliet, Cohoes, Mechanicsville, Lansingburgh, Green Island, Waterford and Stillwater. Also connections with the Fitchburg for points north and east. Cars leave Albany for Troy,

9 a. m. 2 p. m.
11 a. m. 4 p. m.
6 p. m.

Cars leave Troy for Albany,

8 a. m. 3 p. m.
10 a. m. 5 p. m.
12 a. m.

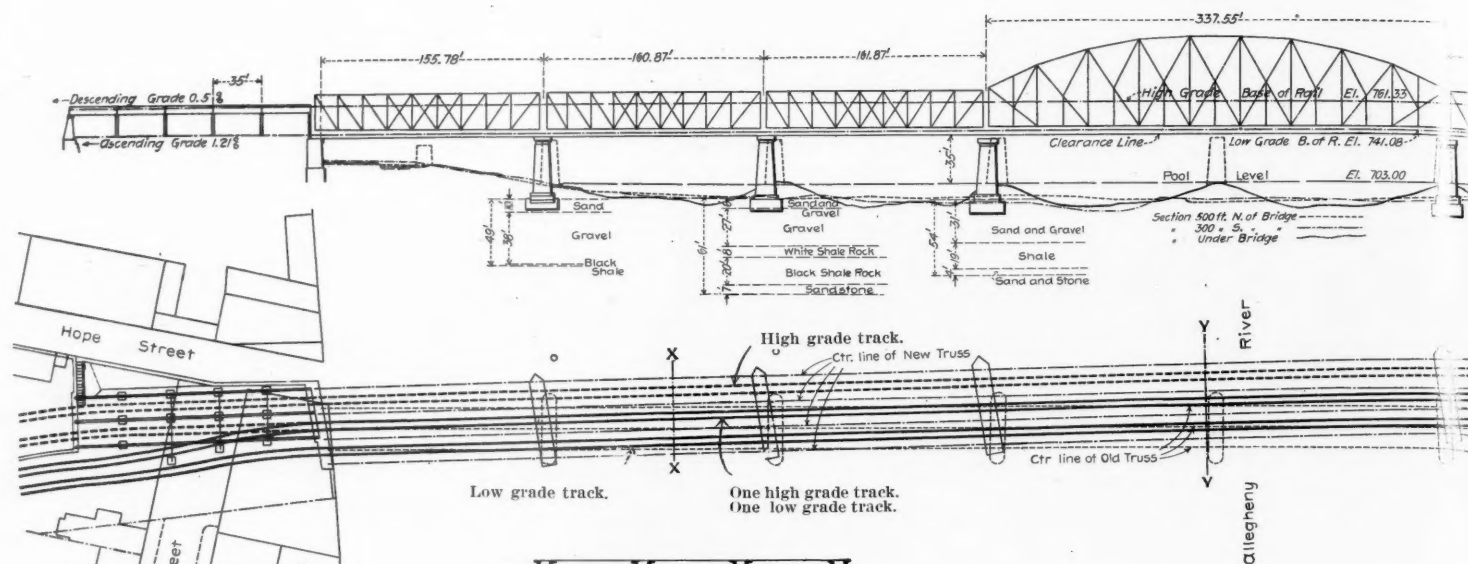
Cars leave Albany for Cohoes, Lansingburgh, Waterford, Mechanicsville and Stillwater, at

10 a. m. 2:30 p. m.
5:30 p. m.

No collections or deliveries are made at stations between Albany and Schenectady on account of the delay which would result, since passenger and freight traffic is handled on the same tracks, and no sidings for this purpose have yet been built. In fact, the ability of the company has been taxed to handle the increase in this branch of the traffic, which is reaching considerable proportions. The receipts last March on the Albany United Traction lines were about $2,500 from express traffic, and on the Schenectady line they were $1,132. Complete returns for the month of April were not in, at the time this article was written, but all indications pointed to an increase above the figures for March.

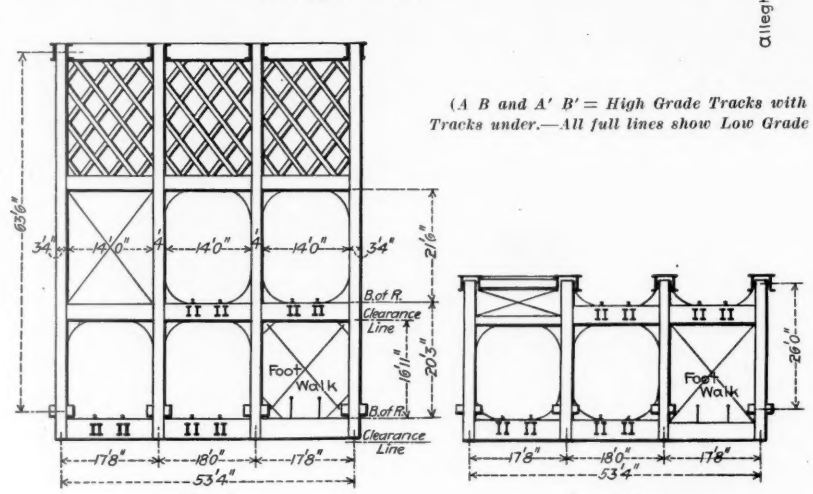
The method of handling this traffic most advantageously has been a subject for considerable discussion, and the ideal way seems to be to carry the express matter over the lines during the night, when passenger traffic is but little interfered with, and the power is idle. It seems probable that this will be developed and experimented with during the coming summer. It is also very feasible to run extra freight cars at night in the summer time to carry fruit and garden truck into town, and this in itself is capable of development into an important branch of the business. The quickness of transit and the relative freedom from the jolting incident to hauling by teams would bring small fruit to the market in good condition.

The Albany & Schenectady line, as stated, operates its own express cars. The United Traction Company's service is eight years old, being distinctly a pioneer in handling express matter on traction lines. This class of traffic was first undertaken between Albany and Troy, in September, 1894. From that time until June, 1895, it was conducted without profit, not only because it was new, but because it was begun on a rather large

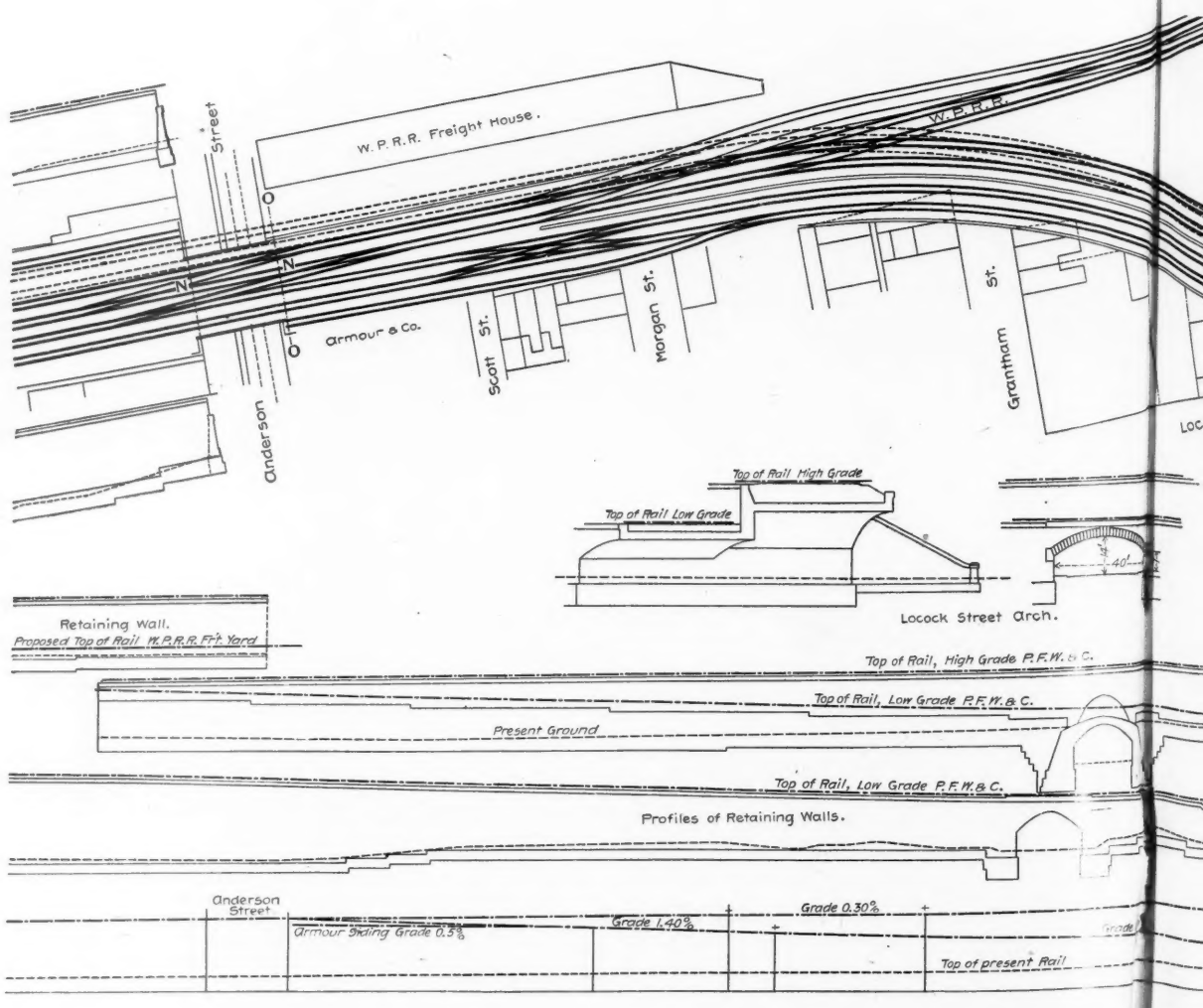


Allegheny end.

(A B and A' B' = High Grade Tracks with Low Grade Tracks under.—All full lines show Low Grade Tracks.)

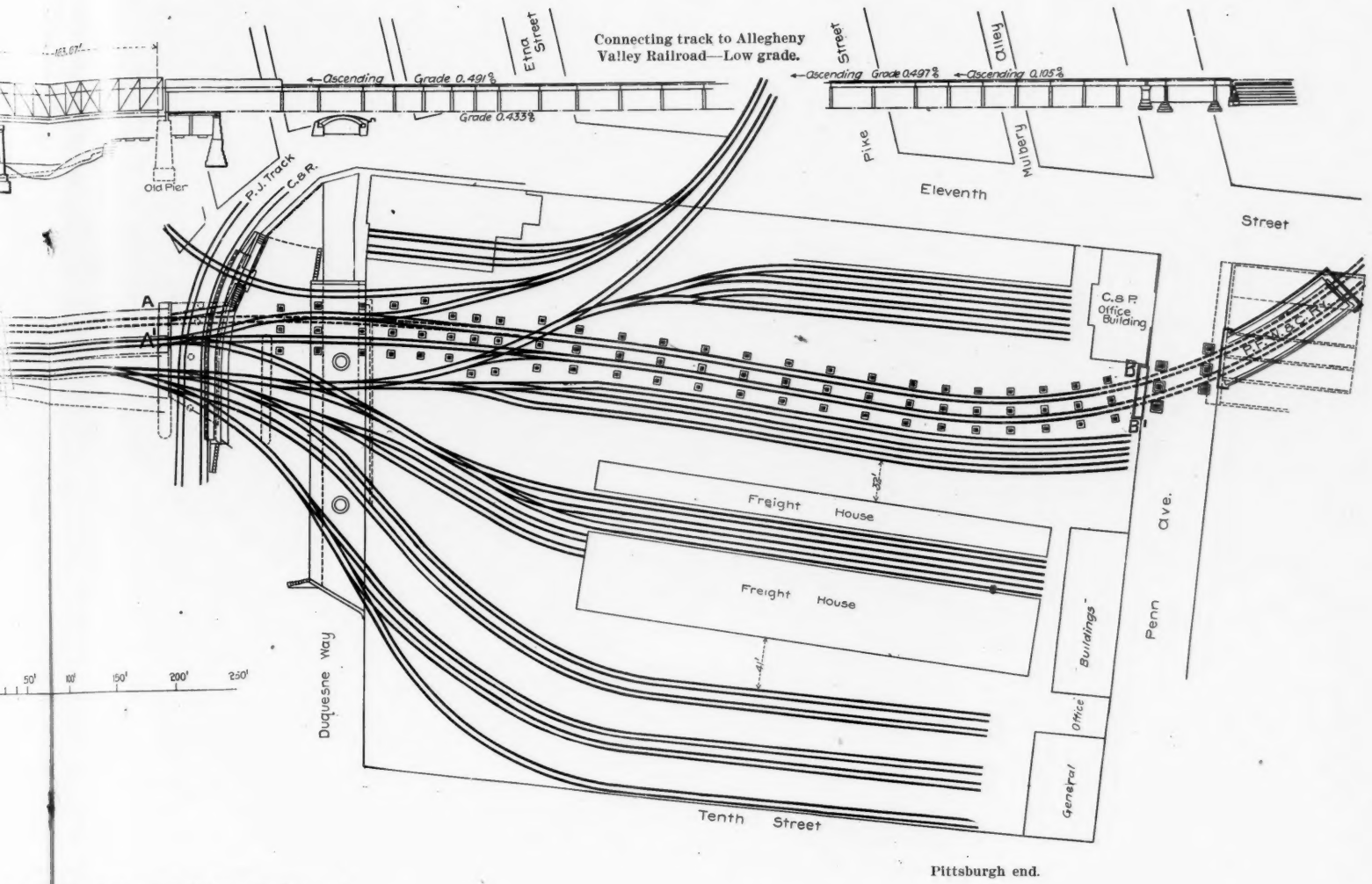


The Allegheny River



(The Bridge proper begins a little southeast of Robinson street, near R. R. The relative position o

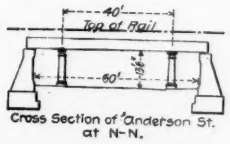
Allegheny Approach to the Allegheny River Bridge, Pittsburgh,



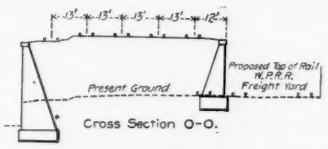
Pittsburgh end.

Allegheny River Bridge and Pittsburgh Approach.

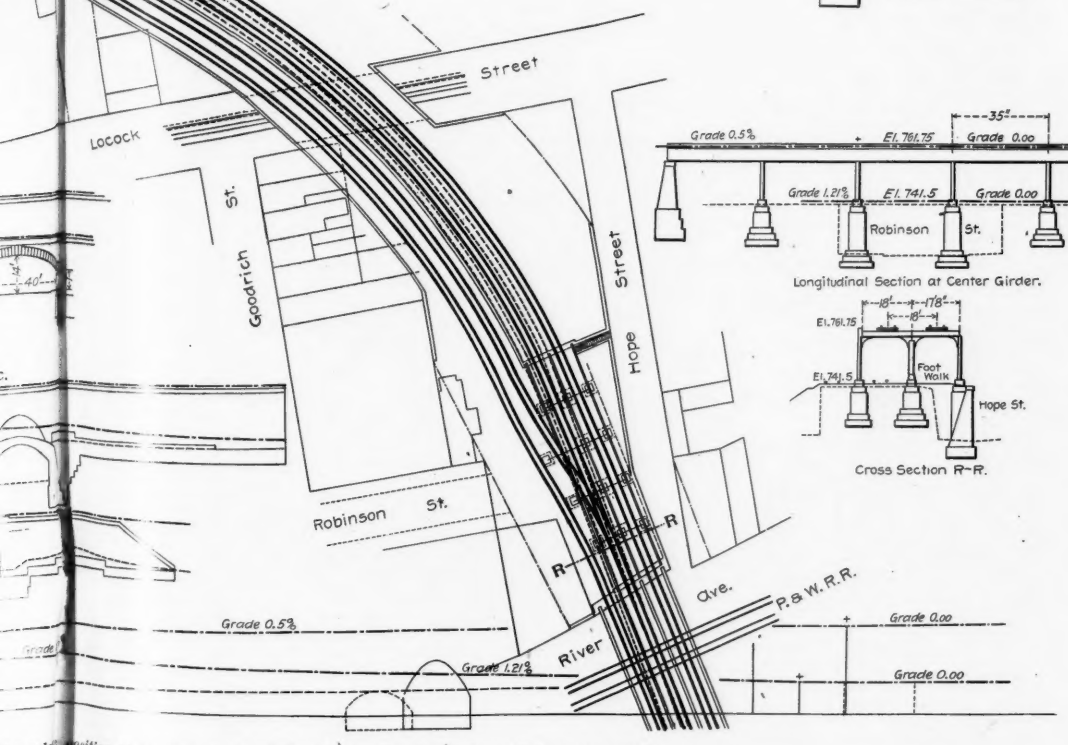
Dotted lines show the Present Location of Tracks.

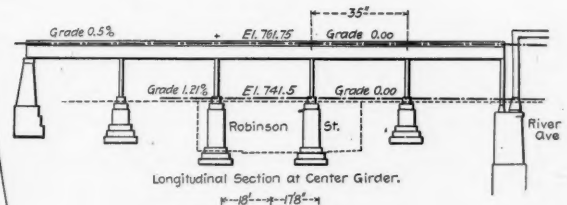


Cross Section of Anderson St. at N-N.



Cross Section O-O.





Longitudinal Section at Center Girder.

Cross Section R-R.

(The relative position of the two parts of the drawing has been changed to save space.)

Bridge, Pittsburgh, Fort Wayne & Chicago Railway.

scale, with almost the present equipment of cars. But since the summer of 1895 the express business has been increasingly profitable. There is one very interesting point in this connection, which has proved, it is safe to say, more or less of a surprise to all concerned. Since the present activity in the electric express began, the business of the National Express Co., its chief competitor, has increased, instead of falling off. This would seem to show that the competition of electric lines may have a stimulating effect on steam traffic, by creating business.

The traffic conditions on the Hudson Valley road, the route of which is shown on the accompanying map, are slightly different from those of either the Albany & Hudson or the United Traction and Schenectady lines. The tracks, as soon as the suburbs of Troy and the adjacent towns are cleared, lie entirely on private right of way, and there is no large city to serve as a northern terminus, but a series of prosperous towns lie all along the route. The southern terminus is now at Troy, but as soon as certain conditions and equipment required by the United Traction Co. are complied with, and the bridge over the Mohawk at Cohoes is sufficiently strengthened, the cars will run to State street and Broadway, Albany, where all the lines terminate, on a trackage agreement. The freight house, on River street, Troy, is smaller than the United Traction freight house in Albany, but is ample for the present needs of the service. The express equipment now in operation consists of six 33-ft. cars, inside measurement, of 40,000 lbs. capacity, and two smaller ones. Five cars are operated to Warrensburg and Greenwich from Troy, giving a double service daily except Sunday, and the business amounts to about $100 a day. It is impossible to obtain any accurate figure for this, however, as the mileage and the service are being extended month by month—almost week by week—and the service has only been in operation a short time. But it can be fairly said that it has passed through its period of inauguration, and is now on a paying basis. On the northern part of the line a regular service of freight cars carrying coal and all kinds of miscellaneous goods is to be installed, and two electrical locomotives have been built for the company by J. M. Jones, Sons & Co., of Watervliet. They are at present used to switch standard freight cars from the Greenwich & Johnsonville Railroad, at Greenwich, back to the mills on the Hudson Valley line, carrying coal, pulp, wood, etc. Cars are handled to the extent of 30-50 weekly.

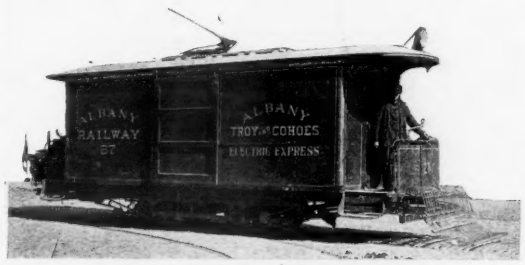
One of these locomotives is shown in the illustration. They are equipped with four 110 h.p. motors, and it is estimated that they will be able to haul about 15 loaded cars up a ruling grade of 2 per cent. But long trains are not expected to figure largely in the traffic to be undertaken, and the economies of electric traction are likely to prove greatest in handling less-than-car-load lots. It is not expected that these electric trains will enter the large cities, but they are intended to operate freely in the country districts, and exchange traffic with the steam roads. There are a large number of factory and mill properties in the district traversed, and it is reasonable to expect that a considerable originating traffic can be built up. The cars now running from Troy confine themselves of necessity to express service, but this includes bulky groceries, tinware, etc. Third-rail is not used on the Hudson Valley, power being taken from the overhead trolley.

The Troy & New England, previously mentioned as being the only one of the five lines in this locality which had not found its freight service profitable, presents no special features in its equipment. The road runs along the highway and is operated by overhead trolley. One freight car is run daily between Albia and Averill Park, in each direction. This car is of the same general type as the smaller of the Hudson Valley express cars, and measures 27 ft., inside. This company is one of the earliest in the field, having maintained its express service for nearly seven years, but usually with trailer cars. Its rates are 10 cents a hundred for light freight, and $1.50 per ton for heavy. The teamsters who collect and deliver are paid by the 100 lbs., and the management, owing to the natural disadvantages with which the line is confronted, says that there is no money in freight, under the present conditions.

The passenger business of these five lines has reached very large proportions. The mileage operated is about 242; 80 by the United Traction, 27.55 of which is within the city limits of Albany, 103 by the Hudson Valley, exclusive of additions building, 35 by the Albany & Hudson, 15 by the Schenectady, and nine by the Troy & New England.

The suburban business on the steam lines between Albany and Schenectady was formerly very large; possibly the largest in the country relatively to the populations served. The competition of the Schenectady electric road, which opened Sept. 1, 1901, has reduced this 75 per cent. in the last four months. Last November the line carried over 65,000 passengers, and in December, over 75,000. The business is now estimated as about 3,000 a day. This line runs along the highway, and was hence not expensive to build, and the service is frequent, with large, vestibuled cars, which contain a smoking compartment in one end. This is an attractive feature of all the large cars running out of Albany, and a narrow passageway runs between the compartment and the side of the car, so that the passenger section may be reached from either end of the car without passing through the smoking compartment.

The United Traction Co. carried on its various lines from Dec. 30, 1899, until June 30, 1900, 13,081,753 passengers, or an average of about 72,275 daily. In the year ending June 30, 1901, it carried 27,732,556, or an average of 75,980 daily, and it is estimated that the increase for the current year will be equally substantial. Traffic arrangements with the Schenectady, Hudson Valley and Albany & Hudson lines were completed in 1901. The Hudson Valley cars, as stated, do not yet run into Albany, but will do so soon, and within a short time it is expected that cars connecting with both the Albany and Troy boats will be run direct to Lake George, although this would be for the summer months and summer travel only. Through cars will probably be run from Albany and Troy, via Mechanicsville, to Saratoga early in May. The fare from Albany to Glens Falls, 55 miles, the first 12 of which are over the tracks of the United Traction Co., is $1.00, and the route is extensively advertised for its scenic beauties. From Glens Falls to Warrensburg, the terminus of the line, 16 miles further, the fare is 25 cents. Exclusive of the city streets, the running time of the cars averages about 16 miles an hour, although they are capable of high speed.



"Electric Express," United Traction Co.

The high speed at which the cars can be run is one of the striking features of the service. At the time of the opening of the road, the 35 miles were traversed by the inspection cars in 52 minutes, and 60 miles per hour is stated in the Railroad Commission report to be the maximum speed. Under ordinary conditions, however, allowing for frequent stops, the run is made in about two hours. The fare is 50 cents.

The following tables show the miles operated, gross receipts and operating expenses (including taxes) for the year ending June 30, 1901. Also number of passengers, and gross receipts from express business, calculated on a per diem basis, in order to bring the returns, which change rapidly, as nearly up to date as possible. It will be noted that the Hudson Valley and Albany & Schenectady lines have not been in existence long enough to have an annual report; and the Albany & Hudson and United Traction Companies are printing their first, for a complete year.

	Miles of road.	Gross rec. year ending June 30, 1901.	Operating expenses, year ending June 30, 1901, incl. taxes.	No. Pass. per day (av'ge).	Amount express business per day.
United Traction..	80	$1,331,879	$968,541	75,980	$83.00
Albany & Hudson.	37	102.810	100,017	*940 / †1,032	$64.00
Hudson Valley....	103	.....	.....	.....	††100.00
Albany & Sch'n't'y	15	.....	.....	3,000	38.00
Troy & New Eng..	9	27,381	16,370	784	3.50

*Local.
†Through.
§Paid Albany & Hudson by the American Express Company.
††Estimated.

	Gross revenue per mile of road operated, year ending June 30, 1901.	Density of traffic. Net income after deduction of taxes, per mile of road.	Pass. carried per day, per mile of road.	Express business per day, per mile of road.
United Traction.....	$16.648.50	$4,541.74	950	$1.04
Albany & Hudson...	2,778.64	75.48	53	1.73*
Hudson Valley.....	.....	.....	...	0.97
Albany & Sch'nect'dy	.....	.....	200	2.53
Troy & New England	3,042.33	1,223.34	87	0.39

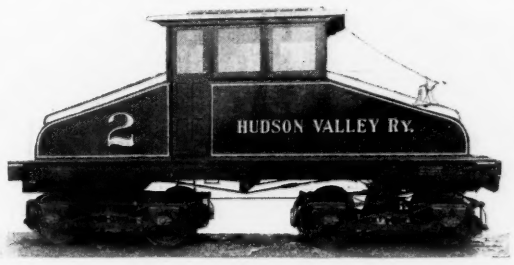
*Paid Albany & Hudson by American Express Company.

Concentration of Wealth and Its Results.

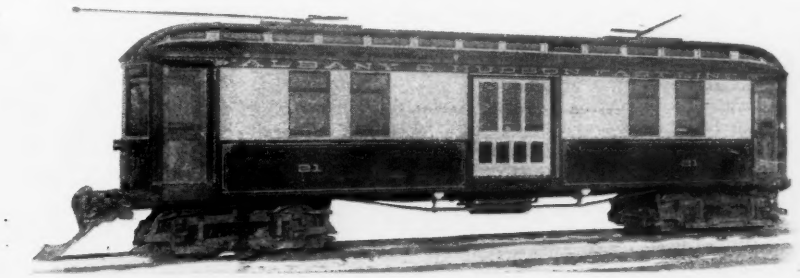
[Extracts from articles in *The Independent.*]

By Charles R. Flint.—The wheat fields of Dakota have been brought by aggregated capital nearer to Liverpool than the plains of Marathon are to Athens. A ton of American wheat can be carried a mile for a third of a cent in two minutes. In Macedonia it takes a bullock team an hour. Aggregated capital has built great steamships, which have largely reduced ocean freight rates. Between 1870 and 1880, for instance, the rate for coal from England to Buenos Ayres was 40 shillings; in 1900 it was only one-quarter this sum. The rates to Rio fell 50 per cent. during this period; to Alexandria, 60 per cent.; to Odessa, 63 per cent. Lumber was taken in 1900 from Quebec to London for 19 shillings, as against 88 shillings in 1874. Saltpeter was carried from Valparaiso to England for 22 shillings in 1900 and for 55 shillings in 1874. From San Francisco wheat used to cost 57 shillings; it has dropped to 22 shillings. By utilizing the small savings of individuals in the construction of ships bigger than any but the largest capitalists could build, the world's steam marine increased from 5,250,000 tons in 1874 to nearly 22,000,000 tons in 1900. In numbers the steam fleet had doubled, while in tonnage it had quadrupled.

By J. H. Selz, a shoe manufacturer.—Only a few days since a young man of excellent appearance came to me as an applicant for a position. He brought a letter of commendation from the chief of a department of a certain railroad where he had been employed. "Why do you leave the service of the railroad?" I asked him. His answer surprised me. "In the three years," he answered, "that I have worked for this company I have never seen the Superintendent, the General Superintendent, the General Manager, the President or any executive higher in authority than the head of the one department in which my work has been done. True, I have been once promoted to a position paying $50 a month. There is no reasonable hope or chance for speedy promotion. The best I can reasonably look forward to is a place paying $100 a month. In nine months I have worked every Sunday excepting four. Since the railroad has gone into the combination there's no future in it for the man who is so near the bottom that he does not come in contact with the men who have the power to make advancement possible. For this reason I determined to get out of the business while I could and go into one where there is a fair fighting chance for a man to get ahead by good hard work. The other field is too big, and where there is no chance to make individuality felt there is little hope or encouragement."



New Electric Locomotive for Hudson Valley Line.



Albany & Hudson Express Car—Now Used as a Locomotive.

No annual report of the Hudson Valley has yet been issued, since the company was incorporated Aug. 14, 1901, as a merger of the Glens Falls, Sandy Hill & Fort Edward; Warren County; Greenwich & Schuylerville Electric; Saratoga Traction; Saratoga Northern, and Stillwater & Mechanicsville lines. The service has been so changed and enlarged since that time that there is no value in a compilation of the former operations of the component parts of the system. A number of parks and picnic grounds have been developed, and the excursion business is very profitable. The possibility of handling trains of passenger cars with the electric locomotives, on special occasions, has also been considered, although they are intended primarily for freight business.

The passenger business of the Albany & Hudson is in many respects analogous. The 35 miles of line between the terminals pass through a very attractive country, from a scenic standpoint, and the excursion business in the summer time is heavy. There are also enough towns of importance along the route to furnish a profitable all-the-year-around business. Motive power on the Albany & Hudson is taken from an exposed third rail, except in the towns, where overhead trolley is used. But as the private right of way is entirely fenced in, and power is carried under crossings by cable, this is not a source of danger. The roadbed is ballasted with gravel, and train despatching is done by telegraph and telephone, as on standard steam railroads. The rails are 80-lb., and 3,000 ties are laid per mile. The passenger cars are 53 ft. long, seating 60, and were built by the Wason Manufacturing Co., with Brill trucks and steel-tired wheels. The first car was run over the line on Oct. 20, 1900, and a regular service inaugurated shortly afterwards. Gross earnings from passengers during the year ending June 30, 1901, were $80,499; from freight, $18,323; from mail, $1,632, and from express, $2,355, a total of $102,810. Total operating expenses were $100,017 including taxes. On the Hudson local line, 342,991 passengers were carried; on the through line, 376,745.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY
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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

The gross earnings of the railroads for the month of April, as compiled by *The Chronicle*, show an increase of 11.03 per cent. on an increased mileage of 1.55 per cent. These figures cover 88 roads working 95,147 miles. The increase comes from practically all sections of the country. The largest gain in amount shown by any of the roads reporting, is the New York Central, which gained on gross earnings $595,000 over April of last year. The Illinois Central gained $390,000 independently of a gain of $98,000 by the Yazoo & Mississippi Valley Road. The Norfolk & Western gained $446,000; the Baltimore & Ohio, 263,000, and the Chesapeake & Ohio, $201,000. The Canadian Pacific and the Great Northern each gained considerably over half a million, and the Northern Pacific almost half a million.

The Inter-state Commerce Commission appears to be contemplating an order requiring the railroads to report the ton-mileage and earnings of the principal articles of freight. It is not easy to see what useful object will be attained by collecting such statistics. Doubtless it would be interesting to know how much the railroads earn from grain, flour, live-stock, coal, cotton, etc.; but unless some important use can be made of the facts gathered, the labor of collecting and computing them cannot be justified. All tariffs are required to be filed and accessible to the public. The actual rate required is the important thing for the public to know; not the quantity of freight which pays the different rates on the different lines. There is scarcely any limit to statistics of this kind which may be collected, and which in some cases, might be very interesting, as, for example, the average rates for different distances. Many freight statistics might be of great value entirely outside of the transportation business, chiefly as records of production and the inter-relation of markets; but how much real, usable information of value to producer, merchant or consumer, should we get? The German Empire for several years endeavored to collect such statistics, and published graphical charts, showing the shipments of certain staples from certain territories and their destination —that is, the districts to which they were consigned, and where, presumably, they were consumed or exported. Such information, if the public gives due attention to it, ought to be of great value as a guide in expanding and restricting production. In Germany, however, it was found difficult and costly to collect the facts, and their publication has been, we believe, abandoned. It should be remembered that it is the use actually made of statistics, not the possible use of them, which justifies expenditure for compiling them.

It has been suggested that statistics of different commodities are needed in order to settle the point, which has recently been disputed, whether railroad rates as a whole have actually advanced during the past two or three years. For many years, down to the beginning of the present period of prosperity, the general tendency of freight rates was downward, but it is unquestioned that within the last two years some rates have been raised. The average ton-mile rate on all commodities, as now reported, will not, of course afford any instructive information as to how much these advances have increased the transportation tax borne by the public, for the quantities of freight carried at low rates may have increased so much faster than the quantities of the freight on which the rate has been raised as to make the average wholly useless. But it is pretty safe to say that any commodity average that could be made by the Government would be equally worthless. The desired end would still be far in the distance. From the standpoint of the statistical theorist, commodity averages would be counted desirable as being a step nearer what is wanted; as being the best information that could be got from annual or monthly reports, and decidedly better than one general average. But while the statistician is thus advancing a single step, a smart newspaper reporter would make the whole journey. As we have said in the foregoing paragraph, the actual rates on specific commodities, at particular places, are the essential thing; and daily newspapers in New York, Chicago and elsewhere have often and with comparative ease made statistical investigations which were as difficult as would be the task of finding out whether hardware or sugar or live-stock or dry goods have been charged higher rates since 1898. The Interstate Commerce Commission should engage a few such reporters. Backed with the Commission's authority they could get in two months what by the regular statistical channels would not be made available under two years; and they would get it at less cost. One writer asks for ton-mile statistics on grain by rail so as to see whether it would pay to enlarge the Erie canal; but a New York reporter could get that information from the New York Central in one day. It is claimed that with adequate official statistics of the kind here under consideration, a public body would avoid such an error as that made by the late Industrial Commission when it reported that a 25 per cent. increase had taken place in railroad rates; but it seems to us that the only thing that a statistical office can do with the author of such a statement as that is to give him up as hopeless. His ignorance must be of the incurable kind.

The Trainman and the Brakes.

A few days ago an accident happened because the "air-brakes would not work." This familiar explanation is something like "malaria," which is the easy diagnosis of a lazy or incompetent physician. In the same way, air-brake failure is the quick and easy explanation of the shiftless engineman or signalman. But in the case in point there was an actual closing of the train pipe, or rather of the hose, caused by a displacement of a drawhead; and this brings up a question of operating rules and methods, rather than of mechanical arrangement, which has sometimes occurred to us.

It is true that accidents do happen once in a while because the train line is closed somewhere in its course. The most usual cause is an accidental closing of the angle cock in the train pipe. So far, no acceptable mechanical way of guarding entirely against this kind of accident has been discovered. Cocks to work automatically have been tried at considerable cost, but without such success as would justify their introduction. We may be pretty certain that the hand-operated angle-cock in about its present form will be the standard practice for years to come, for it is here now through no indifference and no parsimony. And further, the continuity of the train line is sometimes interrupted by accidents quite apart from the closing of the angle-cock, as we have so lately seen. What then is to be done, or is there nothing to do?

As a matter of course, we must assume that the line is open and in order when the train starts, the reservoirs charged and all the apparatus operative. All that is a matter of routine trial and inspection, but now we have to provide for things that may happen on the road.

While we now see little to expect from further mechanical safeguards in this detail, something may yet be done by rules and discipline. The trainman (in passenger service the fiction of brakeman has been abandoned) might again be made a brakeman. For want of practice, he has pretty nearly forgotten the call for brakes—or at least the vigilance of his faculties is a good deal below 100 per cent.—and he is not likely to get the hand brake set up in time to do any good if he does hear and recognize the call. It is to be remembered that a good many of him never handled the brake wheel much, if at all. But why not make him smart and responsible in using the conductor's valve? For example, the trainmen might have special instructions to open the conductor's valve the first thing on a call for brakes, and then man the hand brakes if the train is not already stopped. The passenger trainman of the present day really ought to be regularly drilled, at least enough to make him somewhat familiar with the call for brakes and with his duty when he hears that call. Surely, we are not going to assume that passenger trains will never require an emergency stop which the engineman is powerless to make—even though it be true, as undoubtedly it is, that such emergencies are rare; and if we admit the liability at all, we recognize the need of trained men to deal with the emergencies. Possibly a trainman may not be required to prevent disaster in this way any oftener than a shopman has to help put out a fire; perhaps not so often. But passenger-train disasters when they do occur are likely to be more distressing than a shop fire, hence the propriety of making brake-drills at least as effective as fire-drills in shops.

Obviously, the utility of trying to set the brakes through the conductor's valve depends on a sufficient supply of air back of the point where the train line is closed, and this we must assume. But we have good authority for thinking that the assumption is not violent.

Mr. Forney's Reminiscences.

Mr. M. N. Forney's "Reminiscences" of the last 50 years, which filled the hall and secured the close attention of all present at the New York Railroad Club on Thursday of last week, took on to some extent an autobiographical character, and as such was peculiarly interesting to the *Railroad Gazette*. For, had it not been for Mr. Forney, there probably would not now be any *Railroad Gazette*. It is true, he was not responsible for its birth; but without the kind of work which he was qualified to do, and which he did, in all probability it would have died in infancy. We do not wish to affirm that no other man existed who could have done equivalent work; but in those days such a man was so hard to find, that the then non-existent electric light would have been needed in a search for him.

And this suggests that there was one omission in the reminiscences of Mr. Forney. The changes in railroads and rolling stock since 1870 have been hardly more striking than the changes in the men who have charge of them. The number of men who had any special training for the railroad career before they entered it was then extremely small. As in every new art, the practitioners were, and had to be, prepared for their business by practicing it, with little help from the experience of others, and, generally, with little preliminary training of any kind. One of the most accomplished of railroad managers used to say: "If we could only find a man who could calculate the area of a circle and also knew what a good weld is, I don't know what we wouldn't pay him." This was a somewhat hyperbolical statement of the then condition of things. It is true that there were giants in those days, as in all others, who by native force of mind, reflection and study mastered the principles as well as the practice of their art, and contributed greatly to its progress; but giants are not common at any time, and most of us need all the instruction we can get. We fancy that at the New York Railroad Club, our manager could have found several men, from the locomotive and car departments, who could calculate the area of a circle and even solve more complex problems. At the risk of wounding some who may still survive, we may recall the fact that an enterprising inventor secured the written approval of several well-known master mechanics in responsible positions for an "improved" locomotive which Mr. Forney proved, and made evident to the meanest capacity, could not even turn its driving wheels around.

Mr. Forney might truthfully say (though he didn't) of the railroad history of the past half century, "Part of which I was." But we are inclined to think that his greatest service to the railroad world has been in the incitement he has given to the recording, publication and discussion of experiences in railroad practice. The present generation of railroad men, familiar with the numerous flourishing clubs and societies, whose papers, often of very great value, are more than a busy man can read, can hardly appreciate the almost total absence of such literature when Mr. Forney began to search for such information for the readers of the *Railroad Gazette*. For this work he had rare qualifications. He had learned his business in the same way as nearly all the master mechanics of that day, and as the largest part of it must be learned in all days. Of all the many pictures thrown upon the screen to illustrate Mr. Forney's lecture last week, to his friends the most interesting was the portrait of the 18-year-old boy, Forney with his dinner-pail under his arm, taken when an apprentice in Ross Winans' shops. That ingenuous youth evidently was the father of the man. For it will be permitted to us to say, that there is something besides ability, information and experience which has secured to Mr. Forney the respect and confidence of the railroad world—something else and something more—character. Not to call a man names to his face, as it were, we will let Horace do it for us:

"Integer vitae scelerisque purus."

Annual Reports.

Michigan Central.—The annual report of this company, for the year ending Dec. 31, shows the largest earnings in the company's history and the greatest gains reported in any year of the present period of prosperity. The movement of traffic, nevertheless, shows certain irregularities of considerable interest, and the working of much the same influences as were to be noted in the recently issued report of the Lake Shore. As with that company the increase in passenger receipts was more notable than in freight, but the record of the Lake Shore in showing larger aggregate increase in passenger receipts than in freight is not repeated by the Michigan Central. The gain in this department was $754,474, or nearly twice the largest gain of previous years. Freight receipts increased $982,418, comparing with $875.351 in 1900, and $1,061,132 in 1899. The average ton-mile rate has risen by 0.54 mill in the last two years to a total of 6.18 mills. The greater share of the increase has been due to the growth of local freight. The increase in the average rate has been larger in that class of traffic than in the other classes. Few companies give these statistics thus classified. For a series of years the averages per ton mile have been in cents:

	East-bound.	West-bound.	Through.	Local.
1901	.453	.464	.456	.760
1900	.430	.458	.437	.737
1899	.391	.457	.408	.691
1898	.435	.490	.441	.716
1897	.468	.460	.466	.729

In this period the total average ton-mile rate has varied between 5.97 mills in 1898 and 6.18 mills in 1901. In 1901 there was an absolute decrease in the eastbound movement, while in each of the preceding four years there had been large and regular gains. The loss last year is attributable presumably to the smaller movement of grain, dressed meats and other commodities affected by last summer's drought. This is indicated by known facts of trade, and by the Lake Shore's report of its commodity movement, these facts being absent from the Michigan Central report. The Lake Shore, with 57 per cent. of its tonnage eastbound freight, reported increase of only 91 million ton-miles in that traffic as against a gain of 295 million ton-miles in westbound freight. This great increase in westbound tonnage, which continues to be, as in 1901, a distinguishing feature of railroad traffic, also appears in marked degree, together with remarkable development of local tonnage. Michigan Central ton-mile records bearing on this point, for a series of years follow (000 omitted):

	East-bound.	West-bound.	Total through.	Local.
1901	688,952	282,236	971,188	1,108,465
1900	731,277	238,988	970,265	1,035,837
1899	648,224	230,629	878,854	1,071,760
1898	569,682	169,544	739,227	925,931
1897	479,715	177,555	657,271	876,334

In 1901 the changes in east and westbound movement practically offset each other. The gain of $982,400, therefore, was largely due to the increase in local business. Comparing the 1897 figures with 1901, however, the gain in through traffic exceeds that in local.

The record for the same years of the passenger movement, exclusive of emigrant business, is as follows:

	East-bound passenger miles (000 omitted).	West-bound passenger miles (000 omitted).	Local passenger miles (000 omitted).	Total earnings.
1901	23,511	23,326	179,270	$3,822,690
1900	15,743	14,938	145,474	3,292,690
1899	14,543	13,467	136,379	3,055,800
1898	11,229	12,079	121,124	2,740,780
1897	17,451	18,718	118,144	2,651,797

The gain in westbound passenger mile movement in four years has been 4,608,000, and in eastbound 6,060,000, while in local passenger travel the gain was 61,126,000 passenger miles.

Maintenance of way expenses increased last year $799,000; equipment, $358,000, and transportation expenses, $385,000, with taxes $141,000 higher. Working expenses thus absorbed $1,516,000 of the $1,760,000 increase in gross earnings, and 79¾ per cent. of total receipts. Net income was $983,296, or 5¼ per cent. on the stock; on which 4 per cent. dividends were declared. Out of the balance $210,000 was appropriated for second track work. Costly work of this character, comprising 17½ miles, was carried on in 1901, all paid for out of income, except some built by the Canada Southern. That company is to build 18½ miles additional this year.

No change in capital stock was made in 1901, but bonds for $2,000,000 (3½ per cent.) were issued to retire $1,600,000 maturing 5 per cent. bonds, and to fund $400,000 expended in building branches for a leased line. In this fiscal year provision will be made for retiring $10,000,000 5 and 7 per cent. bonds.

Mexican Central.—The annual report of this company, the largest of all the Mexican railroads, for the year to Dec. 31, makes an unfavorable showing, in common with the other railroads in that country. Traffic and gross revenues were affected by adverse financial conditions in the country, and expenses and net income by the continued fall in the value of the Mexican silver dollar. The company received between 50.89 cents and 44 cents, for Mexican dollars, and an average for the year of 47.83 cents as against 48.92 in 1900. As late as 1896 the company received 53.17 cents, and in 1891 an average of 76.74 cents United States currency in exchange, so that it will be seen the loss on the total revenue, which in 1901 reached $17,125,340 (Mexican), was extraordinarily burdensome. In addition to these matters of general application, felt by all the Mexican roads, the Mexican Central suffered losses from several special local causes, such as the destruction of the smelter at El Paso in July, 1901. This caused an estimated loss in gross earnings to the company of over $301,000, besides necessitating moving empty cars northbound for southbound tonnage. Mexico last year also suffered shortages in staple food crops, considerable enough to induce the government to suspend the import duty on corn and wheat from the United States for three months in the year.

Despite all these circumstances gross receipts, as recorded in the annual report, show an increase of $269,795; but expenses increased by $656,815 (Mexican). Increase in gross earnings, however, was more apparent than actual. An increase of 81 miles in average length of operated road is reported, and gross earnings per mile ($8,193) were $191 less. Net earnings per mile decreased $280 to $2,335. Gross earnings on commercial freight were $8,020 per mile, a decrease of $232 in the year. This has to be compared with an increase of $563 in 1900, and uninterrupted yearly gains per mile since 1892, when earnings on commercial freight were $4,146 per mile. Comparisons of the income account with gross and net earnings in Mexican currency and with the net earnings and other items of the income account in United States currency are shown below.

	1901.	1900.	Changes.	
Gross	$17,493,673	$17,223,878	Inc.	$269,795
Expenses	12,507,010	11,850,194	Inc.	656,816
Net, Mex.	$4,986,663	$5,373,684	Dec.	$397,021
Net, U. S.	2,384,598	2,628,576	Dec.	243,978
Other income	182,517	.....		.....
Total income	$2,565,115	$2,628,576	Dec.	$63,461
Charges	2,937,276	2,622,483	Inc.	314,793
Deficit	$372,161	Sur. $6,092		$378,253

Increase in gross earnings, as shown above, was due entirely to larger local business, the gain in that traffic being $305,000, fairly evenly divided between freight and passenger business. There was a decrease on international freight of $175,854, but an increase of $34,400 in international passenger traffic. An increase of $97,587 in freight on construction material also figured in the gross earnings as stated above. So far this year, earnings reflect recovery from the business depression which affected traffic in 1901 and to some extent in 1900. Gross earnings for the three months to March 31, the latest recorded, show an increase of $520,000, or over 12 per cent. in gross earnings, and $429,000, or more than a third, in net earnings, Mexican currency. There has, however, been a further fall in the price of silver to the lowest figure ever recorded, which, of course, if not overcome, later in the year, will further adversely affect the income account in the current year.

It will be seen that in 1901 the fixed charges were not earned by over $370,000. The company had to draw on its subsidy fund, as before 1899. The company has over $32,800,000 in income bonds besides the $47,955,000 capital stock, which, of course, on present operations has poor prospects of being made intrinsically valuable. In fact, at the present time, the interests in control of the property are preparing a plan of readjustment of the capital account, which will involve assessments on the junior securities in order to put the capitalization at a reasonable figure and to provide new funds which the company needs for its development.

Within the past year new interests have purchased a controlling amount of the voting securities and they plan many extensive changes in the property. As one step they purchased last year the Monterey & Mexican Gulf, which secures to the Mexican Central control of all the rail routes to Tampico, which is securing a rapidly enlarging proportion of the total import and export movement of Mexico. A proposal to purchase the Mexican International which, if successful, would also have placed the company in a dominant position as regards the traffic through the gateways on the United States boundary, failed because that action was anticipated by the new interests controlling the Mexican National. It seems very likely, however, that these two properties will be operated in close harmony. Indeed, the new board of directors of the Central includes the Vice-President of the National, who is the active operating head of that property in Mexico.

An interesting table in the report shows for a series of years the tonnage and the values of the imports and exports of Mexico through the Gulf ports and the gateways leading into the United States. From these figures we have compiled the following table showing the changes in this trade movement through the various ports and gateways for the last two years.

	Exports (in Silver). 1901.	1900.
Tampico	$43,877,120	$39,989,700
El Paso	21,481,100	17,234,800
Eagle Pass	6,287,080	2,412,230
Laredo	6,948,350	5,455,600
Vera Cruz	21,892,200	25,439,950
Other ports, etc.	48,173,150	59,254,100
Total	$148,659,000	$150,056,380
	Imports (in Gold). 1901.	1900.
Tampico	$9,712,960	$10,367,790
El Paso	5,593,590	5,550,000
Eagle Pass	5,694,460	5,878,400
Laredo	8,073,860	6,733,370
Vera Cruz	22,328,150	21,990,800
Other ports, etc.	13,680,430	10,797,700
Total	$65,083,450	$61,318,170

A statement of the tonnage movement would show different changes from those above. Thus, though there was a slight increase in values of imports at El Paso, the tonnage movement stated in metric tons decreased from 209,300 to 143,000 tons. On the other hand, though there was a loss in import values at Tampico, there was an increase from 505,400 metric tons in 1900, to 532,800 tons in 1901. On the whole, however, the changing currents in trade are interestingly shown above.

The "Zone" Passenger Tariff in Russia.

The Russian Government in 1894 introduced a new general passenger tariff, the general principle of which was that up to a distance of 300 versts (199 miles) a regular rate per mile was charged, while greater distances were divided into zones, with a fixed charge for each zone. For the third class a uniform charge of 20 kopeks (10 cents) for each zone is made, but the zones are of varying lengths, as follows:

301 to 500 versts, 8 zones of 25 versts each.
501 to 710 versts, 7 zones of 30 versts each.
711 to 990 versts, 8 zones of 35 versts each.
991 to 1,510 versts, 13 zones of 40 versts each.

Above 1,510 versts, the zones were uniformly 50 versts each, so that for the 1,500 versts above 1,510 the charge for a third-class passenger was for 30 zones at 20 kopeks = $3.10 for very nearly a thousand miles. For 3,010 versts (1,995 miles) the gross amount of the fares by this tariff, which is preserved up to this distance, is 42 rubles ($21.67) first-class, 25.20 rubles ($13.00) second-class, and 16.80 rubles ($8.67) third-class. At the time of the promulgation of this tariff the routes on which a journey of more than 2,000 miles was possible were very few, and the amount of travel over such distances must have been insignificant. The effect of the tariff on the whole line of about 6,000 versts, for a passenger coming 1,000 miles from its western terminus would be to add 120 x 20 kopeks, = $12.40, to the cost of a ticket for a third-class passenger, or 0.31 cent per mile for that part of the journey, so that a trainload of 100 (a number hardly reached as an average in any country of the world except India) would yield 31 cents per train-mile, which is perhaps one-third of the cost in European Russia.

The new tariff, which takes effect May 1, adds a new class of zones for distances above 3,010 versts, each of 70 versts, with charges per zone of 40 kopeks third-class, 60 kopeks second-class and 1 ruble (100 kopeks) first class. Thus the rate per mile for distances above 3,010 versts is made higher than for the 1,500 versts from 1,510 to 3,010. The third-class passenger has added to his fare $3.10 for the second thousand miles of his journey, and $4.44 for the third thousand. But computation shows that the rate per verst in the 70 verst zones is practically equal to the average rate per verst for the entire 3,010 versts preceding. On the face of it, this seems an irrational system; but it is probably less unreasonable than it appears—in fact, it is substantially similar to the common practice in this country. Nearly all journeys in Russia of more than 2,000 miles must be in part over the Siberian Railroad, and the cost of transportation in this remote wilderness is doubtless very decidedly greater than in European Russia, just as, when the Pacific railroads were first built the cost was greater over them than over lines east of the Mississippi.

The application of the rates of the new zone over the whole line of the Siberian Railroad will make the charge for that part of the journey about $43 first-class, by an ordinary passenger train, which is certainly cheap enough for a journey of 4,000 miles. Heretofore the Siberian Railroad has not been treated as part of the Russian railroad system in applying the zone system. The passenger paid fare to its western terminus as if it were a separate journey; and to the price for this journey was added that of the journey over the Siberian Railroad as if it had begun at Chelyabinsk—the "sum of the locals," as our railroad men say.

NEW PUBLICATIONS.

Railway Mail Service. By G. G. Tunell. Chicago: R. R. Donnelley & Sons Co.

This is a pamphlet of 24 pages, giving a historical address which Mr. Tunell lately delivered at the University of Chicago, and also at the University of Minnesota. Mr. Tunell, who is connected with the Chicago & North Western Railway, will be remembered as the author of a recent interesting study of the question of the reasonableness of the compensation which the Government pays to the railroads for carrying the mails. The work now before us is a mere sketch, but it gives many interesting facts concerning the way in which the business of carrying the mails has been improved since the time (1835) when the railroads thought they were doing good service if they carried the mail between Jersey City and Washington in 13 hours. Indeed, the most striking feature of the pamphlet is that in which it is shown that for several years after railroads were opened for business in the Eastern States, the old stage coaches, being better organized, and having the powerful motive to retain their contracts as long as possible, were able to give better service than the railroads gave. The latter part of the pamphlet, telling what has been done since Colonel George S. Bangs improved the railroad mail service in 1874, is quite brief. This part of the subject has, of course, been dealt with by other writers. With characteristic care and thoroughness, Mr. Tunell takes his facts

mainly from official documents, giving references to his authorities. The first comprehensive assorting of letters on the cars, for delivery at a terminal station, was on the Hannibal & St. Joseph in 1862. Mr. William A. Davis, of the St. Joseph post office, started this innovation, doing it in order to avoid seriously delaying the overland coaches at that city when the train from the East came in behind time. There had been before this, however, some distribution of way mail in cars.

Street Railway Investments.—Published by the Street Railway Journal, New York. Five dollars a copy.

The ninth edition of this valuable book has been received. It contains, among other things, 31 folding maps of the more important street railroads in the United States. Some of these maps are printed in colors. A table is given showing by comparison the gross receipts of all companies earning upwards of $25,000 for the years 1900 and 1901. Detailed reports of 1,281 companies have been prepared which show facts concerning the physical as well as the financial condition of the properties. The figures given include both operating and leased roads and take in the figures for all new roads. Important consolidations which have taken place during the year are duly chronicled, with the figures involved in the transaction. In each case the date the information was given by the street railway company making the report, is set down. This is an important point for those desiring accurate information.

The Manual of Statistics; Stock Exchange Hand-Book, 1902. Twenty-fourth year. Octavo, 912 pages; maps and index. New York: The Manual of Statistics Co. $5.00.

This manual, which has long been known as useful and authoritative, is intended to cover information of railroads, street railroads and industrial companies; of Government securities, stock exchange quotations; statistics of mining, grain and provisions, cotton, money, banks and trust companies. Abstracts are given of the history, official organization, finances, results of operation of many different companies. Highest and lowest prices on the various exchanges for different periods and for several cities are also given. Statistical tables of quantities and values of various products add to the usefulness of the volume.

Water-Supply; Considered Principally From a Sanitary Standpoint. By William P. Mason, Professor of Chemistry, Rensselaer Polytechnic Institute, etc. Third edition, rewritten. Eight vo., vi, + 448 pp., 40 figures, 22 half-tone plates. New York: John Wiley & Sons. London: Chapman & Hall, Limited. 1902. $4.00.

The quickest and easiest way to show the plan and scope of this book is to give an abstract of the table of contents, as follows: Ancient Water-supplies; Drinking-water and Disease; Artificial Purification of Water; Natural Purification of Water; Rain, Ice and Snow; River and Stream Water; Stored Water; Ground Water; Deep-Seated Water; Quantity of Per Capita Daily Supply; Action of Water Upon Metals.

Appendix: Analyses of City Water Supplies; Typhoid Fever Death Rates for American Cities; Typhoid Fever Statistics for American and European Cities; Effects of Contaminated Waters Upon Fish; Water for Industrial Purposes; Liquids Deemed Polluting by English Rivers Pollution Commission; Use of Sea Water for Street Washing, Sewer Flushing, etc.

Concerning the new edition the "publishers' note" tells us that "particular attention is called, among other improvements, to the treatment of the following subjects: the mosquito-malarial theory and the experiments of Celli and Manson, touching upon the transmission of malaria; the relation between the growth and decay of algæ and the resulting odors observed in waters, particularly those of lakes and reservoirs; the relation of goitre to water-drinking and Kocher's investigations thereupon; Alessi's experiments as to the production of artificial typhoid in animals. There is also given a consideration of the vexed question so often found in water contracts, 'What is a good, pure, and wholesome water?' Under Filtration will be found a full account of the workings of the new plants at both Albany and Ashland, together with statistics illustrating the result of such filtration upon the typhoid death-rates. The new methods for the mechanical analysis of sands for filter-beds are described. Considerable new material will be found under the subject of Mechanical Filtration, including a discussion of the new iron coagulant and also the influence of sedimentation-basins when the filter is running upon soft water. Space is also given to a discussion as to the merits of the rival systems of filtration. Under Self-purification of Streams the recent investigations concerning the pollution of the Illinois River by the opening of the Chicago drainage-canal are commented upon. A point of particular value is touched upon showing the tendency of dissolved gases, such as oxygen and carbon dioxide, to attack iron at boiler temperature."

After this it is not necessary to say much about the book. It is not written with the purpose of teaching methods of construction, and these are touched on only incidentally; but that side of the great general subject which is here dealt with is illuminated by the broad experience and the learning of the accomplished author.

TRADE CATALOGUES.

R. D. Wood & Co., 400 Chestnut street, Philadelphia, have just issued three bulletins dealing with their product, which among other things includes, water pipes and supplies for waterworks, gas mains, sewers, culverts, etc. They make automatic punches, hydraulic riveters with patent hanger, and a very powerful universal I-beam shears. They also make many forms of pumping machinery as well as gas producer plants. The bulletin issued in March, illustrates various forms of fire hydrant. The April bulletin is concerned with gate valves, hub, flange and screw pattern, for water and gas pipes. A very ingenious indicator valve post for water pipes is illustrated. This device displays the words "open" and "shut," appropriately, according as the valve is open or closed.

American Pop Safety Valves and Gages.—The American Steam Gauge and Valve Co., of Boston, Mass., has issued a catalogue giving information concerning the varieties of pop valves and gages which are made at its works. Cuts are shown of special pops with straight levers; with compound drop levers, and twin valves with compound levers. Prices are given as well as information regarding sizes. On page 6 is to be found a short history of the gage manufacturing business. Information is furnished about the original Bourdon gages, Lane's improved double spring pressure gages with non-corrosive movements, Lane-Bourdon gages, and the American recording gage.

The Locomotive Trade.

An officer of the Baldwin Locomotive Works says: "Our output of locomotives during April was 128. About 10 of these were small electrical mine engines. Two-thirds of the balance were freight engines, practically all of the most powerful modern type. The March product was 124. There is every indication that the output of the present year will break all the past records of our works.

"During the last few months we have been unable to obtain the usual supply of material and operations have been much hampered. The congestion has not yet passed away, and under the circumstances our figures for April are gratifying.

"We have large domestic orders booked and others are in negotiation. The field for exporting locomotives is not very flattering at present. In portions of Europe there has been a recent over-production, so that at this time there is no large demand for engines. The comparative ability of American and foreign manufacturers to contract for quick delivery has become reversed of recent months. A year or two ago we would have agreed to fill a foreign order in four or five months, or even in 90 days, if it was for a single locomotive. To-day we will not guarantee delivery short of eight or nine months. The conditions in Germany are particularly discouraging at this time to American locomotive companies. The German builders have put themselves into such a position as to enable them to go to England and take large orders there, underbidding the English firms. Much of this work is filled at a loss. But the result is to keep American competitors in this line of manufacture out of the German market. We have every encouragement to bid, but no chance to secure the work at figures at which we are willing to manufacture. It is all, to a considerable extent, a reflection of the condition of pressure under which the American iron and steel business now labors.

"There is no truth in the report that we intend to erect a plant in Pittsburgh. We believe that one strong point in our favor, in all competition with the American Locomotive Works, lies in the fact that the latter carries on its business at scattered plants, while we are concentrated here in Philadelphia."—*Special to Wall Street Journal.*

TECHNICAL.

Manufacturing and Business.

The Stanley Electric Mfg. Co. has moved its New York office from 71 Broadway to 29 Broadway.

W. P. Cosper, for several years with the western department of the Consolidated Car Heating Co., has resigned to engage in other business.

Some changes have been made by the Protectus Company, of Philadelphia. E. P. Sloane has severed his connection with the company, and F. L. De Armond, heretofore Assistant General Manager, has been appointed General Manager to succeed him.

Superintendent Russell, of the American Locomotive's plant at Dunkirk, has resigned, as has also Edward B. Clark, Superintendent of the Pittsburgh Works. Mr. Clark is succeeded by J. R. Howgate, heretofore Assistant Superintendent at Schenectady.

The Fore River Ship & Engine Co. has just been awarded a contract for two very large steel floats for the New York, New Haven & Hartford R. R., and now has work on hand to keep the entire plant running on about full time until late in the fall of 1904.

The Chicago Pneumatic Tool Co. reports that it has received as many orders during the first two weeks of May as in any entire month since the company started in business. There has been a noticeable increase in orders for its pneumatic tools from Germany, France and Great Britain.

Clement F. Street has resigned as Manager of the Railroad Department of the Dayton Malleable Iron Co. to accept a position with the Wellman-Seaver-Morgan Engineering Co., of Cleveland, Ohio. He was with the Dayton Co. for three and one-half years and assumes his new position July 1.

David H. Gildersleeve, M. E., manager of the eastern office of the Cleveland Pneumatic Tool Co., has resigned to accept a position in the sales department of the Chicago Pneumatic Tool Co., with headquarters at 95 Liberty street, New York City. The appointment takes effect May 26.

S. W. Hayes, Chief Engineer of the Jamestown, Chautauqua & Lake Erie (electric) road, has entered the employ of Westinghouse, Church, Kerr & Co., and will be engaged on electric railroad construction for that concern. He will continue to look after the Westfield extension of the road named until it is finished.

Iron and Steel.

George Wick, President of the Youngstown Sheet Steel & Tube Co., is reported to have resigned.

The Lackawanna R. R. has let a contract for 13 new bridges to be put in on the Utica Division by the American Bridge Co.

The Allegheny Steel & Iron Co. has just finished a second open-hearth steel furnace and will put it in operation in about two weeks.

Ground has been broken in South Chicago, at 110th street and Calumet avenue, by the South Chicago Furnace Co., for a steel mill where it is said rails will be made.

It is said that the Inland Steel Co., whose plant is located at Indiana Harbor, Ind., a short distance south of Chicago, will be ready to begin operations on a large scale in June.

At the special stockholders' meeting of the United States Steel Corporation, held in Hoboken, N. J., on May 19, the plan to convert certain preferred stock into bonds was ratified.

The United States Tool Co. has been incorporated in New Jersey, with $100,000 capital, by Geo. A. Penney, of Pittsburgh, and Peter Backes and Theo. Backes, of Trenton. The company proposes to make railroad contractors tools, etc.

On May 15 J. C. Maben, President of the Sloss-Sheffield Steel & Iron Co., at Birmingham, Ala., announced that his company was selling iron on the basis of $16 for No. 2 foundry, which is $4 a ton over published prices of the past few weeks.

It is said that 135 wooden bridges and trestle on the Shenandoah Division of the Norfolk & Western have been replaced by steel bridges and viaducts. At the end of a year there will not be left a single wooden bridge or trestle on that division.

It is reported that negotiations have been under way for some time for a consolidation of several steel casting companies of this country into a concern to be known as the American Steel Foundries, with a capital of about $40,000,000, divided equally into preferred and common stock.

It is said that at the next meeting of the Steel Plate Association, which is subject to the call of Mr. Gary, a plan to consolidate the various concerns which are included in the Eastern Association, with a capital of something like $40,000,000, will constitute the chief business of the meeting.

Griffin Wheels in Germany.

One of the most striking differences between American and European railroad practice has been the almost universal use of chilled cast-iron wheels here, and the use of the much costlier steel-tired wheels in Europe, where in some countries cast-iron wheels have been prohibited by law on steam railroads. Now Friederich Krupp himself, one of the chief manufacturers of steel-tired wheels, has prepared to manufacture chilled cast-iron wheels by the Griffin process, and is circulating a pamphlet entitled "The Griffin Wheel: A Contribution to the Question of the Safety and Economy of Chilled Cast-iron Wheels in Railroad and Street Railroad Service."

Purdue's Locomotive Museum.

Purdue University has now in process of erection a temporary building for the accommodation of its collection of historic locomotives. The building is 60 ft. x 64 ft., and contains four tracks, three of which are already occupied by locomotives. The list includes the "James Tolman," an engine of English design; the B. & O. engine No. 173, known as a Hayes ten-wheel "Camel"; and a 16 x 24 in. American type engine from the Chicago & North Western Railroad. The University very much desires to obtain an inside-connected engine which it can add to its collection.

Chicago Track Elevation.

In an effort to force further track elevation the Chicago City Council has passed an ordinance requiring three of the railroads entering the City to construct and maintain gates at eight grade crossings within the city limits. The roads are given 30 days in which to comply with the ordinance. Should they fail to do so the police will be directed to stop each train and each engine at the crossings specified. The ordinance further directs that should the companies seek to defy the efforts of the police the enginemen, conductors or other trainmen shall be arrested, charged with committing misdemeanors, and fined from $150 to $200 for each offense. This ordinance applies only to crossings in the Thirty-fourth Ward and the roads involved are the Chicago & Western Indiana, the Belt Railway of Chicago, and the Chicago Terminal Transfer. However, the plan may be taken up in other

sections of the city, with other roads that have delayed in complying with the track elevation ordinances.

Pressed Steel Car Company.

C. M. Mendenhall has been appointed assistant to the General Manager and is located at Allegheny. The appointment was effective May 17.

Another New Steel Company.

A despatch from Pittsburgh on May 20 said that the only change in the Crucible Steel Co. of America made at the annual meeting of the stockholders was the re-election of Reuben Miller, who retired some time ago. The company will guarantee $5,000,000 bonds of the Clairton Steel Company, which is being formed to take over the St. Clair Furnace Company and the St. Clair Steel Company, both of which are subsidiary companies of the Crucible Steel Company of America. With the return of Reuben Miller to the active duties comes a report that he will also have associated with him on the Board of Directors H. C. Frick and Henry W. Oliver.

THE SCRAP HEAP.

Notes.

The Boston & Albany is running on its Newton Lower Falls branch a steam motor passenger car. This branch is one mile long. The car is one which has been heretofore used on the Pennsylvania Division of the New York Central.

Pennsylvania papers say that the Pennsylvania Railroad is enlarging its floral department. A large force of men has been planting vines around car houses, flagmen's boxes and other small buildings, and these structures will soon become things of beauty.

The latest reports from Washington indicate that the leaders in Congress have decided that it will be useless to try to pass any amendment to the Interstate Commerce law at the present session. The session is now far advanced, and it is already evident that any proposition which may be brought before the House will lead to protracted discussion.

The New York, New Haven & Hartford has reduced the train crews on its express trains to the basis of two trainmen (brakemen) to each train. Hitherto, the number of brakemen on these trains has been, approximately, one man for each two passenger cars, as is the case with local passenger trains; but as men are not now required to man the brakes, it has been decided that on trains which are composed partly of parlor or sleeping cars, the porters can perform some of the duties which would be done by brakemen. It is said that the total number of men dismissed from the passenger service is about 60.

The coal mines in the anthracite regions are practically all closed by the strike which was begun last week; and as a consequence, freight traffic has suddenly shrunk on all of the principal railroads which carry coal from those mines. Many trainmen have been laid off, and on the Shamokin Division of the Reading a number of passenger trains were taken off. Most of the roads also suspended station and shop men, and one newspaper report estimated that many thousand railroad employees were idle. The Lehigh Valley has begun to use soft coal on the locomotives of all its trains except the Black Diamond express.

The Legislature of Ohio has passed a law relieving railroad companies from the duty of maintaining electric lights at street crossings in cities. Ordinances compelling railroads to furnish a light at this, that, or the other crossing, have, for a number of years, been very popular with city governments, in Ohio, as also in various other western States, and the passage of this bill at once produced excitement in many cities. After the bill had passed one branch of the Legislature, a meeting of 300 mayors was held to try to prevent it from becoming a law, but, so far as we can gather from the press reports, this action was wholly futile. A number of mayors now threaten to enforce low-speed ordinances against the railroads running through their cities.

It is reported in Philadelphia, and apparently confirmed by officers of the company, that the Pennsylvania Railroad has notified the Western Union Telegraph Company that it will terminate its contract with the Western Union on December 1, next. The 21 years for which the contract was made, expired some months since. It is said that for a long time the railroad has deemed the contract too favorable to the telegraph company; and the present action would seem to indicate that negotiations looking to a modification have failed. Philadelphia papers say that of the 2,000 telegraph offices on the lines of the Pennsylvania road, 1,500 are absolutely controlled by the railroad company; and the railroad company owns about 70 per cent. of the telegraph lines which stand on its right-of-way.

Fame.

A western journal speaks of certain engines on the Atchison as Baldwin vulcan compounds.

Hindoo Students at Purdue.

Amar Nath and Ram Lal Bery have entered as freshman students in the Department of Mechanical Engineering of Purdue University. These gentlemen started from their home in India some four months ago for Japan, with the expectation of obtaining there a technical education. Upon their arrival there they discovered that it would be necessary for them to acquire the Japanese language, in view of which fact they decided to extend their journey to California. Their ambition lying in the line of railroad engineering, and the University of California at Berkeley offering but meager opportunities for work in such lines, they finally decided to make another move to Purdue where, as above stated, they are now entered as students. They already know English well.

A Russian Strategic Railroad.

Russia is to complete next summer a railroad in its Trans-Caucasian territory from the Fortress Alexandropol southward and eastward, a little distant from the Turkish boundary, to Erivan, about 94 miles long. It may have great strategic importance, in case of war with Turkey.

Slandering a Railroad.

You must not sass the railroad company in Austria. A passenger who was directed by a conductor to take a place in a car already crowded (which could never happen here; O, no!) relieved his feelings by calling the railroad company all kinds of bad names. The company sued him for slander, and the court condemned him to $4.00 fine, or two days' imprisonment, besides costs.

Another Fast Run on the Wabash.

The new record that was made on April 10 by the Wabash "Continental Limited" had another minute cut off on May 9. It was in a run from Decatur to Granite City, Ill., with the same engine that made the previous record, but with another engineman, J. B. Sanford. The distance of 105 miles was made in 95 minutes actual running time. The average speed, including stops, was 66.3 miles an hour; excluding stops it was 70. The highest speed attained was between Boody and Blue Mound, a distance of six miles, which is recorded as having been covered in four minutes, or at a rate of 90 miles an hour. There were four cars in the train. The engine, Atlantic type, with its tender, weighs 281,600 lbs. It has 19 x 26-in. cylinders and 79-in. drivers. The weather was calm and the rail condition good.

University of Illinois.

The catalogue for 1901-1902 has just been issued and shows the total registration for the year to be 2,932, an increase of 427 over the previous year. The University has also just issued a circular describing its new courses in business training. These courses are designed to give the special training for modern business. The work may be taken by undergraduates in connection with other courses or as post-graduate work. A noticeable feature of these new courses is the requirement in what is called mechanical technology. Every student who takes one of these courses must learn something of the modern methods of the generation and transmission of power. These are not technical courses, but are intended to give such general knowledge of the subjects as every well educated man should have.

Massachusetts Institute of Technology.

Entrance Examinations will be held at the Rogers Building, 491 Boylston street, Boston, Mass., on Thursday and Friday, June 26 and 27. A second series, for those unable to be present at the first, will be held on September 23 and 24. For the convenience of applicants at a distance from Boston examinations will be held on the above dates in the 16 other cities. Candidates who intend to be examined in any other place than Boston are requested to send their names to the Secretary in time for him to receive them by June 15. A fee of five dollars is to be paid in advance by every candidate who is examined at any other place than Boston.

The Institute offers summer instruction during the months of June and July, supplementing the work of the regular school year. Summer courses are undertaken primarily for the benefit of two classes of students: first, for those who wish to prolong their stay in summer, in order to distribute their work over a larger portion of the year, or to gain more time for advanced work in their regular courses—time especially valuable in the fourth year, when original investigations and the examination of professional problems form an important part of their occupations; second, for those who, through illness or for other causes, have deficiencies to make up. The continuity of effort and freedom from interruption made possible by summer work are of particular value in many of the laboratory courses. The Summer Courses are open to persons not students in the Institute of Technology, if they possess the necessary qualifications.

LOCOMOTIVE BUILDING.

The Georgia Southern & Florida is having one locomotive built at the Baldwin Works.

The Great Northern of Canada has ordered from F. M. Hicks two 50-ton freight engines, rebuilt by the Hicks Locomotive & Car Works.

The Kansas City, Mexico & Orient has reserved space through Ira M. Hubbell with the American Locomotive Co. for 70 locomotives of various classes. The first order will probably be for moguls suitable for either freight or passenger service.

CAR BUILDING.

The Grand Trunk has ordered 1,000 box cars from the American Car & Foundry Co.

The Pittsburgh Coal Co. is having 50 freight cars built at the Erie Car Works, Erie, Pa.

The Southern has ordered 50 furniture and three postal cars from the American Car & Foundry Co.

The St. Louis Southwestern has ordered one parlor buffet car from the American Car & Foundry Co.

The Kentucky Refining Co. is having 50 freights built at the Jeffersonville Works of the American Car & Foundry Co.

The International Construction Co. has ordered 20 box cars, 50 flat cars and one caboose from the American Car & Foundry Co.

The Pittsburgh, Allegheny & McKees Rocks is having 50 freight cars built at the Pressed Steel Car Co., McKees Rocks, Pa.

The Westinghouse Electric & Mfg. Co. is having five freights built at the West Detroit Works of the American Car & Foundry Co.

F. M. Hicks has sold another lot of flat cars to the Chicot Lumber Co. They are to be rebuilt at the Hicks Locomotive & Car Works.

The Cincinnati, Hamilton & Dayton is having 100 freight cars built at its own shops. This includes the order reported in our issue of May 2.

The Ingoldsby Automatic Car Co. of St. Louis has received orders for 500 more steel dumping coke cars, capable of carrying 82,000 lbs. of coke.

The Pennsylvania is having 500 freight cars built at the Pressed Steel Car Works, Allegheny. This is part of the general order reported in our issue of Dec. 6.

The Globe Construction Co., of Iowa Falls, Iowa, has purchased from F. M. Hicks 30 flat cars of 50,000 lbs. capacity, to be rebuilt by the Hicks Locomotive & Car Works.

The Hicks Locomotive & Car Works has received an order from Horace Geiger, the traveling evangelist, for a private car to be equipped with library, office, organ, etc., for his work.

The Kansas City, Mexico & Orient has reserved space with the American Car & Foundry Co., through Ira M. Hubbell, for 3,000 freight cars of various classes. The order includes coal and flat cars of 80,000 lbs. capacity, 36-ft. standard box cars of 60,000 and 80,000 lbs. capacity, and stock and furniture cars of 60,000 lbs. capacity.

Two combination passenger and baggage cars have also been ordered from the American Car & Foundry Co.

The Burlington, Cedar Rapids & Northern order for freight cars, reported in our issue of May 2, calls for stock cars of 50,000 lbs. capacity for October delivery. Weight, 31,000 lbs.; length, 36 ft. 8 in.; width, 9 ft. 3 in; height, 7 ft. inside measurement, to be built of wood at the Barney & Smith Works. The special equipment includes Simplex bolsters, Sterlingworth brake-beams, Westinghouse air-brakes, Chicago Latrobe Steel Co. couplers, Harrison dust guards, McCord journal boxes, Chicago-Cleveland roofs and Diamond trucks.

The Mineral Range order for freight cars, reported in our issue of May 9, calls for 100 ore and coal cars, to be built by the American Car & Foundry Co. for August 1 delivery, to be built of wood with wood underframes; 60,000 lbs. capacity; length, 26 ft. over end sills; width, 8 ft. 6 in., and height, 7 ft. 3 in. Special equipment includes steel axles, Common Sense bolsters, Congdon brake-shoes, Westinghouse air-brakes, Fulton Engine & Iron Works brasses, Trojan couplers, M. R. standard draft rigging, Harrison dust guards, McCord journal boxes, M. C. B. top hinge journal box lids, Prince's mineral paint, Detroit springs, Diamond arch bar trucks and American Car & Foundry Co. cast-iron wheels.

The Des Moines, Iowa Falls & Northern has ordered three passenger, two baggage, 40 coal and 10 box cars and five cabooses from the American Car & Foundry Co. for August delivery. The passenger cars are to be 66 ft. long over platforms, 10 ft. wide over sills, and 14 ft. 1¾ in. high from top of rail. The special equipment of the passenger and baggage cars includes Lappin brake-shoes, Westinghouse air-brakes and Janney Buhoup couplers. The passenger cars will have Pantasote curtain fixtures and 33-in. chilled wheels. The coal and box cars will be of wood 35 ft. long and 8 ft. 9 in. wide. The box cars will be 6 ft. 10⅝ in. high. The special equipment includes M. C. B. steel axles, Westinghouse air-brakes, side-hung doors on Dunham fixtures, American Car & Foundry Co.'s standard draft rigging, Chicago roofs and diamond trucks. The cabooses will be 32 ft. long, 8 ft. 6 in. wide and 6 ft. 3 in. high, sill to plate.

BRIDGE BUILDING.

ANADARKO, OKLA. T.—Bids are wanted until May 31 for building two steel bridges over Washita River. Address Dyke Ballinger, County Clerk.

BARRON'S FERRY, MISS.—Bids are wanted June 14 by J. B. Mayes, Hazlehurst, Miss., for a steel bridge over Pearl River 400 ft. long; also for two smaller bridges.

BIRMINGHAM, ALA.—According to local report, a viaduct will be built over the tracks at First avenue.

The Birmingham Railway, Light & Power Co., according to report, will build a steel bridge in this city.

It is said the Board of Revenue will pay half of the cost of a new steel bridge over the east fork of the Cahaba River at Parker's Mill.

BRATTLEBORO, VT.—The committee on bridge site has decided on the kind of bridge to be built, the total cost of which is not to exceed $33,000.

BUTLER, PA.—The County Court has confirmed the report for a bridge over Thorn Creek in Road District No. 2. Geo. M. Graham, Clerk of the Court.

CHILLICOTHE, MO.—Bids are wanted June 3 by J. Y. Powell, for a steel bridge 108 ft. long over Grand River.

CHISHOLM, MINN.—We are told that a bridge about 1,200 ft. long will be built over Langyear Lake. No plans are made. W. G. Shane, Village Recorder.

COLUMBIA CITY, IND.—Bids are wanted until 10 a.m., May 26, for three stone arches or culverts. Wm. H. Carter, County Auditor.

COLUMBIA, PA.—The County Court has made an appropriation of $4,500 to rebuild the steel bridge over Duck River north of Columbia.

COLUMBIA, S. C.—The James Island Bridge Co. of James Island has been incorporated to build a toll bridge. The incorporators are W. T. Thompson and J. N. Nathans, Jr.

CONWAY, S. C.—A bill has been introduced in the House of Representatives for a bridge across the Waccamaw River in the interest of the Conway & Seashore R. R. Co.

CORNING, N. Y.—The Common Council is considering the advisability of changing the Erie Railroad bridge over the Chemung River, known as Three-Mile bridge, by having additional spans built.

FALLS CITY, NEB.—Bids are wanted until June 17, by T. C. Tanner, County Clerk, for some bridges.

FINDLAY, OHIO.—Bids are wanted June 3 for the superstructure of a bridge over Blanchard River. Address the County Auditor.

GENEVA, N. Y.—Contracts will be let June 5 for two bridges. W. S. Wood, Secretary.

HARRISBURG, PA.—Viewers have been appointed in petitions for State aid in the rebuilding of 28 bridges in various parts of the Commonwealth, and it is estimated that it will cost the State from $500,000 to almost $1,000,000, if these 28 bridges are rebuilt. It is intimated that the coming Legislature will be asked to repeal the law, which requires the State to pay for repairing or rebuilding bridges destroyed by high waters, etc., as it was never intended to give it the broad scope it has assumed. The Attorney General has the right to file objections to any of the reports of viewers, and has done so in a few instances where it was represented that the bridge was not necessary, or it was intended to spend too much money, but just what rights the State has in the matter has not yet been tested in the courts.

HAZLEHURST, MISS.—Bids are wanted June 4 for a bridge over Pearl River at a cost of about $6,000. W. M. Ainsworth, Supervisor.

HONESDALE, PA.—Viewers inspected the site over the

Lackawaxen River at North Main street last week and recommended the building of a low truss bridge 100 ft. long, with a 50-ft. roadway and two 10-ft. sidewalks.

INDIANAPOLIS, IND.—According to local report, the County Council has refused to make the additional appropriation of $65,000 asked by the County Commissioners for a stone bridge over White River at Washington street, so the contract for a steel girder bridge has been let to the Brown-Ketcham Iron Co., and Wm. Fife & Son, the bid of the former for the superstructure being $75,800, and the latter for the substructure, 30 cents a foot for the piling, and $9.00 a cu. yd. for stone work. The total cost of the bridge is now estimated to not exceed $147,000.

JENKINTOWN, PA.—We are told that no award has yet been made for the plate girder bridge over the North Pennsylvania R. R. tracks at Greenwood avenue by the Philadelphia & Reading.

LA CROSSE, WIS.—According to report, plans are under consideration to have a new bridge built over the Mississippi at a more elevated grade than the present structure.

LA FOLLETTE, TENN.—According to report, contracts are soon to be let for the bridges on the line of the Knoxville, La Follette & Jellico.

LEE, MASS.—The Selectmen, according to report, have consented to build several bridges over the October Mountain stream.

LEXINGTON, MO.—Contract will be let on May 27 by B. D. Weedin, Commissioner, for repairs to a steel bridge and to several wooden bridges.

LINN, MO.—Contracts will be let June 13 by F. J. Laughlin for some bridge repair work.

LISBON, N. DAK.—Bids are wanted June 18, at 3 p.m., by Wm. M. Jones, County Auditor, for a new steel bridge and some repair work.

MARTINSVILLE, VA.—Bids are wanted on June 14 by Colonel C. B. Bryant, of this place, for two steel bridges with wooden approaches. One will be 270 ft. long, over Smith's River at Basset Station, on the N. & W.; the other will be 235 ft. long, over Leatherwood Creek, six miles southeast of Martinsville. The first bridge will require two spans of 80 ft. each, on masonry piers. Bridge No. 2 will require one span of 70 ft., resting on cylinders. On both bridges the roadway will be 21 ft. wide.

MASSILLON, OHIO.—The Massillon, Dalton & Wooster R. R. will be required, according to local report, to build an overhead bridge over the Pennsylvania bridge in this city.

MIDDLETON, OHIO.—The Middleton & Cincinnati Ry. has been granted permission to build a bridge over the canal in this city.

MILLVALE, PA.—Plans are being made by Messrs. Trimble & Miller, Pittsburgh, for a bridge at North avenue.

NATCHEZ, MISS.—Three steel bridges are proposed in the parish of Concordia. We are told that the plans are not yet made. L. M. Dalgorn, Engineer.

NEWPORT, IND.—Bids are wanted until June 17 for building a bridge over Norton Creek on the State Road. Bids are also wanted at the same time and place for building a stone arch known as "Bledsoe bridge." Wm. P. Bell, County Auditor.

NEWPORT, WALES (BRITISH ISLES).—Bids are wanted by the corporation for a bridge over the Usk River. The contract on steel and masonry will be let separately on June 16.

NEW WINDSOR, N. Y.—Bids are wanted May 31 for an iron bridge over Moonda Creek. V. K. Mills, Engineer, Goshen, N. Y.

OLATHE, KAN.—Bids are wanted June 5 for four low truss steel bridges, by the County Commissioners.

OMAHA, NEB.—A bill was passed last week by the U. S. Senate and House of Representatives authorizing the Omaha Bridge & Terminal Ry. Co., successor to the Interstate Bridge & Street Ry. Co., to complete, reconstruct and change a bridge for railroad and street car road purposes across the Missouri River, near Council Bluffs, Iowa, and Omaha, Neb. The bill was approved Feb. 13, 1891, and amended Jan. 28, 1893.

OXFORD, N. J.—New bids are wanted May 24 for the bridge over Beaver Brook. Wm. A. Henderson, County Commissioner.

PERRY, N. Y.—It has been voted to appropriate $7,000 for a bridge over Silver Creek outlet, connecting Walnut and Elm streets.

PHILADELPHIA, PA.—The Pennsylvania R. R. has just let a contract to the Pennsylvania Steel Co. for the superstructure of the northernmost of its two bridges over the Schuylkill at Philadelphia. The other bridge was let some time ago.

ST. LOUIS, MO.—It is stated that the Street Commissioner will spend about $65,000 on the King's Highway viaduct over the railroad tracks.

It is reported that extensive repairs will be made to the Eads bridge, particularly the viaduct part from Main to Third streets.

SAUGATUCK, MICH.—W. R. Takken, Township Clerk, is advertising for bids for June 4 for a steel swing bridge over Kalamazoo River. Probable cost, $8,000.

SAVANNAH, MO.—Bids are wanted until June 2 for building nine bridges, the most important of which will cross the Platte River. J. E. Schnitzius, Road and Bridge Commissioner.

SENATOBIA, MISS.—Bids are wanted June 2 for a bridge over Cold Water River at Brown's Ferry. The main span will be 120 ft.; approaches, 100 and 50 ft. respectively. Sam. J. House, Clerk.

SHREVEPORT, LA.—The City Council is advertising for bids for a bridge to cost about $20,000 and to cross Cross Bayou.

SYDNEY, NEW SOUTH WALES.—Bids are wanted by the Department of Public Works for building a steel lift-bridge over Murray River at Koondrook. Contract will be let June 16. Address the Commissioner for Roads and Bridges at Sydney.

The time for submitting bids for the bridge across Sydney Harbor has been changed until June 30. Address Henry Copeland, Agent General for New South Wales 9 Victoria street, London, S. W., for particulars.

SYRACUSE, N. Y.—The State Board of Railroad Commissioners is considering the application of the Syracuse Rapid Transit Ry. for a bridge over the tracks of the Rome, Watertown & Ogdensburg.

TOWANDA, PA.—It is said plans have been made for the proposed new bridge for the Lehigh Valley.

VIRGINIA CITY, MONT.—Bids are wanted June 6 for a three-span steel flat truss bridge, each span 100 ft. long, over Madison River. H. E. Steffens, County Clerk.

WALNUT GROVE, CAL.—The Supervisors of San Joaquin County are considering with the local board plans for a bridge over the Mokelumne River between the two counties.

WARREN, MINN.—Bids are wanted until May 31 by the County Auditor for building 12 pile and 13 truss bridges for the County Commissioners. A. B. Nelson, Auditor.

WILKESBARRE, PA.—The County Commissioners will let, about July 1, contracts for 37 county bridges; stone arch, iron and iron and concrete, ranging in price from $175 to $1,200. T. F. Peters, Commissioner's Clerk; Geo. R. McLean, Controller.

WILLIAMSBURG, MASS.—A $1,300 bridge will be built near Thayer's dam. The town has voted $1,000.

WILMERDING, PA.—It is said the Pennsylvania R. R. will build a viaduct over some property of the Westinghouse Air-Brake Co.

Other Structures.

BALTIMORE, MD.—The Baltimore Copper Smelting & Rolling Co., according to report, will extend its plant.

BUFFALO, N. Y.—The Buffalo & Susquehanna Iron & Steel Co., it is said, will spend about $3,000,000 on building two large furnaces and several coke ovens. Wm. A. Rogers and Archer Brown, of Rogers, Brown & Co., are interested in this concern.

The Buffalo Foundry Co. will increase its capital stock from $10,000 to $200,000, and will at once build a large jobbing foundry plant, which, for the present, will consist of a main foundry building 320 x 145 ft., of steel construction.

Pratt & Lambert, varnish makers, it is said, contemplate building a branch plant in or near Buffalo.

CLEVELAND, OHIO.—The Wellman-Seaver-Morgan Engineering Co. is building an addition 400 x 120 ft. to its plant. The contract has been let to the Garry Iron & Steel Co. of Cleveland.

COLUMBUS, OHIO.—The Pennsylvania Co. has under contemplation, we are told, building a new engine house, a new power house and a new erecting shop; also an extension to its machine shop and passenger car paint shop in this city, at a cost of about $500,000.

FORT WAYNE, IND.—The Pennsylvania Co., we are told, has in contemplation considerable work in this city at a cost of about $450,000, among which is the construction of a new engine house, new erecting shop and store house, and the installation of a large coaling plant for coaling locomotives.

GREENWICH, CONN.—It is said that plans have been made for the new passenger station to be built in this city next fall.

LEXINGTON, KY.—The Lexington & Eastern Ry. contemplates building extensive terminals in Lexington, but we are told that the plans for this work have not yet been finished.

MADISON, WIS.—It is said that the "Soo line" will build a new passenger station at Barron this year.

MEMPHIS, TENN.—Mr. Gilleas, Vice-President and General Superintendent of the Yazoo & Mississippi Valley road, is reported as saying that it is the purpose of the Illinois Central to make Memphis the center of its shop system, and to spend about $500,000 toward that end.

MENOMONIE, WIS.—It is said that the Omaha Road will build a new passenger station at this place at once.

MOBILE, ALA.—Local reports state that a terminal company is to be organized at once by officers of the Mobile & Ohio and the Louisville & Nashville, to build a union station in this city.

MORGANTOWN, W. VA.—It is reported that the Rolling Mill Co. of North America, recently incorporated, will locate its plant at Morgantown; also that the Iron & Steel Aluminum Coating Co., and the Baldwin Automobile Mfg. Co. will locate here.

NICETOWN, PA.—The Midvale Steel Co. proposes to make some extensive improvements.

OGDENSBURG, N. Y.—The Pittsburgh Reduction Co. is reported to have secured 400 acres of land at Massena, where it will build five large factories to make aluminum. It is said also that the plant will be operated by electricity secured from the St. Lawrence.

OLEAN, N. Y.—It is said that the Pennsylvania has bought a tract of land adjoining its yards in this city and will build some shops. It is said bids are being received on the work, which includes a blacksmith shop 50 x 170 ft., a machine shop 258 x 69 ft., with necessary equipment for both.

OSKALOOSA, IOWA.—It is said that the Burlington Route will build a new station on South Market street, this place.

SIOUX CITY, IOWA.—Reports that certain freight houses in Sioux City are to be torn down by the Union Terminal R. R. Co. and new buildings built are denied by Mr. Stevenson, General Manager of the Union Terminal Co.

TOPEKA, KAN.—W. R. Carter, of Lawrence, has the contract for two shops for the Santa Fe for this place.

WASHINGTON, D. C.—The Union Railroad Station bill was passed by the Senate, May 15.

YOUNGSTOWN, OHIO.—The Youngstown Foundry & Machine Co. tells us that it has recently bought additional land but no improvements will be made at present, as currently reported. An additional cupola may be built this summer.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xviii.)

Accounting Officers Meeting.

The annual convention of the Association of American Railway Accounting Officers will be held at St. Louis, Mo., May 28. C. G. Phillips, Secretary, 79 Dearborn street, Chicago.

Railway Club of Pittsburgh.

A regular meeting of this Club will be held at the Hotel Henry, Pittsburgh, Pa., at 2 o'clock p.m., Friday, May 23. Subject for discussion, "Safety Appliances." New subject, "The Car Record Office," by Mr. C. L. Gist, Supt. of Transportation, P. & L. E. R. R. This is the last meeting until September next.

Western Railway Club.

The new officers elected to the Western Railway Club on May 20 are: President, F. H. Clark; First Vice-President, A. E. Mitchell; Second Vice-President, D. F. Crawford; Secretary, J. W. Taylor; Treasurer, P. H. Peck; Trustees, L. G. Parish, J. L. Carney; Library Trustees, F. W. Sargent, G. Royal and G. E. Parks.

Rocky Mountain Railway Club.

The closing monthly session and regular annual meeting of The Rocky Mountain Railway Club for the season of 1901-1902 was held at the New St. James Hotel, Denver, Colo., May 17. The papers discussed were: "Petroleum as a Fuel," by Thomas Paxton, of the Colorado & Southern Ry; "Do Lifting Injectors Receive Proper Attention?" by W. H. Wallace, of the Burlington & Missouri R. R. in Nebraska; "The Importance of Maximum Loading of Cars," by G. W. Covert, of the Burlington & Missouri R. R. in Nebraska. These papers are all published in the April proceedings.

American Institute of Electrical Engineers.

An extra meeting of the Institute will be held at the House of the American Society of Civil Engineers, 220 West Fifty-seventh street, on Wednesday, May 28, at 8:15 p.m. The general subject of the meeting will be "Electricity in the Army and Navy." After an introduction by the President, papers will be presented by Mr. Caryl D. Haskins, of the General Electric Co.; W. M. McFarland, late Chief Engineer, U. S. N.; Col. Samuel Reber, U. S. A.; Lieut. W. V. H. Powelson, U. S. N.; John Stephen Sewell, Captain Corps of Engineers, U. S. A.; Lieut. Henry George, U. S. N.; Lieut. A. M. Beecher, U. S. N.; Mr. Townsend Wolcott, Consulting Electrician; Dr. Louis Bell, Consulting Electrical Engineer, and others.

Engineers' Club of St. Louis.

At the 544th meeting Mr. A. S. Langsdorf read a paper entitled, "Commercial Testing of Electrical Machinery." He described the regular and special commercial tests made in the factory on the dynamos, motors, transformers, converters, etc., before shipment. The regular tests included the insulation and load tests. The special tests were generally made to determine the efficiency or other special features which may have been guaranteed in the contracts. Other tests are always made on the first machine of a new design in order to determine the electrical constants and to check the calculations of the engineering department. In testing small machines the current generated is consumed in resistances, generally water rheostats. For large machines the power required for testing in this manner would be very excessive and some modification of the stray power method is used for economical reasons.

American Society of Civil Engineers.

The following is the general programme of the thirty-fourth annual convention, held in Washington, D. C., May 20th-23rd:

Committee of the Board of Direction—Mordecai T. Endicott, George H. Pegram, Chas. Warren Hunt.

Committee of Local Members—George W. Melville, John Biddle, William M. Black, David S. Carll, Bernard R. Green, Conway B. Hunt, David E. McComb, Alexander Mackenzie, Alexander M. Miller, Henry M. Wilson.

Tuesday, May 20—10 a. m., Opening session. Address of welcome, Hon. H. B. F. Macfarland, President, Board of District Commissioners; address of welcome in behalf of the local members, Admiral George W. Melville, Hon. M. Am. Soc. C. E.; sketch of the History of the Society during its first 50 years, Charles Warren Hunt, Secretary, Am. Soc. C. E.; annual address, Robert Moore, President, Am. Soc. C. E.

2.30 p. m., Excursion to Cabin John Bridge.

8 p. m., Second session. Illustrated talks, descriptive of local engineering matters, as follows: District Government, Col. William M. Black, U. S. A., M. Am. Soc. C. E.; Sewers, D. E. McComb, M. Am. Soc. C. E.; Water Supply, Col. A. M. Miller, M. Am. Soc. C. E.; Washington Monument and Library Building, Bernard R. Green, M. Am. Soc. C. E.; Electric Railways, D. S. Carll, M. Am. Soc. C. E.; Proposed Park Improvements, Charles Moore, Esq.

Wednesday, May 21—9.45 a. m., Reception by the President of the United States, at the White House.

10.30 a. m., Third session. Business meeting. Report from the Committee on Proposed Amendment to the Constitution relative to admissions to membership; on Time and Place for next Convention; from the Committee on the advisability of action being taken for the protection of engineers, and of the public, from incompetent practitioners.

2 p. m., Excursion to Navy Yard.

8 p. m., Fourth session. Professional discussion of the following subjects:

Topic No. 1. "In contract work, either public or private, is it preferable to make separate contracts for the different branches of trades involved, or to combine all under one general contract?" Opened by Geo. E. Gifford, M. Am. Soc. C. E.

Topic No. 2. "Is it possible and desirable to keep accounts of work in progress in such a manner as to ascertain unit costs on each class of work?" Opened by Samuel Whinery, M. Am. Soc. C. E.

Topic No. 3. "Is steel susceptible of being made as permanent a building material as masonry?" Opened by Charles G. Darrach, M. Am. Soc. C. E.

Thursday, May 22—8.30 a. m., Excursion to Washington Barracks, Fort Washington and Mt. Vernon.

8 p. m., Fifth session. Professional discussions of the following subjects:

Topic No. 4. "In view of the numerous disasters caused by the contracting of channels, or the damming of small streams, should non-navigable streams be under the control of the National Government?" Opened by Rudolph Hering, M. Am. Soc. C. E.

Topic No. 5. "Should the National Government undertake the construction and operation of irrigation works?" Opened by Elwood Mead, M. Am. Soc. C. E.

Topic No. 6. "Should Engineering Practice be regulated by a code of ethics? If so, how can such a code be established?" Opened by Geo. A. Soper, Assoc. M. Am. Soc. C. E.

9.30 p. m., Informal dance.

Friday, May 23—Morning and afternoon. Free. No assignment has been made for this afternoon, it being left free for those who desire to visit interesting local points, such as the Washington Monument, National Museum, Capitol, Congressional Library, War Department, Geological Survey, Coast Survey, National Cemetery, etc., etc.

8 to 11 p. m., Reception at the Corcoran Gallery of Art.

PERSONAL.

—Mr. J. W. Watson, at one time Treasurer of the Central Railroad of New Jersey, died at High Bridge, N. J., May 16.

—Mr. Samuel Knox, for many years Secretary and Treasurer of the Central Railroad of New Jersey, died at his home in Lebanon, N. J., on Sunday, May 18. He was born in New York in 1822.

—Mr. W. S. Lincoln, Chief Engineer of the Wabash Railroad, died at St. Louis, May 16, from the effects of a surgical operation. Mr. Lincoln had seen about 35 years continuous railroad service.

—Mr. J. C. Rawn has resigned as Manager and Engineer of the Roanoke Gas & Water Company to become Chief Engineer of the Pocahontas Coal & Coke Company. Mr. Rawn will be located at Bramwell, W. Va.

—Mr. H. H. Hunnewell, for several years President of the Kansas City, Lawrence & Southern, died at Wellesley, Mass., May 20, of heart disease. Mr. Hunnewell was born in Watertown, Mass., in 1810. He was at one time a director of the Illinois Central, Michigan Central, Hannibal & St. Joseph, Chicago, Dubuque & Minnesota, and a number of other railroads.

—Mr. W. Jolliffer, a well-known civil and mining engineer of the South, died at his home in Roanoke, Va., May 11, aged 57 years. Mr. Jollifer had served in the engineering department of the Baltimore & Ohio, the Atlantic & Great Western, the Richmond & Allegheny, the Norfolk & Western and other roads. For several years he was engaged in engineering work in California and New Mexico.

—Mr. W. R. Woodford, who recently resigned as General Superintendent of the Baltimore & Ohio, has accepted the position of Second Vice-President of the Pittsburgh Coal Company. Mr. Woodford is 45 years old and was born in Dunkirk, N. Y. He began his railroad career on the Great Western of Canada. From there he went to the Michigan Central, and he went with the Wheeling & Lake Erie in 1882.

—Mr. W. S. Jones, who recently resigned as General Superintendent of the Rutland Railroad, was formerly Superintendent of the New York & New England. He went to the Rutland from the Southern in the fall of 1900, when the construction of the new line across the islands and through Lake Champlain was under way, and took charge of that interesting and somewhat unique line. Mr. Jones was the engineer who finished this work.

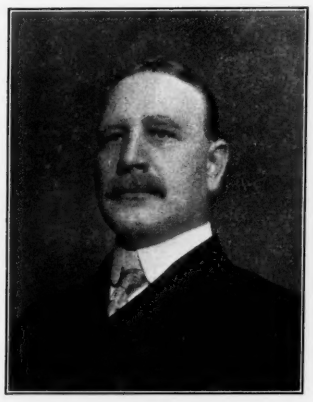
—The Bessemer Medal (British Iron and Steel Institute) was this year awarded to His Excellency F. A. Krupp, of Essen. Mr. Krupp's health forbade his receiving it in person, but he sent his cousin, Mr. Otto Eichoff, to represent him. The first award of this medal was in 1874. The Americans who have received it are: Peter Cooper, in 1879; Alexander Lyman Holley, in 1882; Abram S. Hewitt, in 1890; John Fritz, in 1893, and Henry Marion Howe in 1895. In 1899 it was given to the Queen.

—Mr. J. R. Michaels, who has been appointed Superintendent of the Tennessee Central, began his railroad service on the Chicago, Burlington & Quincy when he was a mere boy, having learned to be a telegraph operator in his father's office at the age of nine. He was subsequently train despatcher on different Western roads, and in 1888 went to the St. Paul & Duluth, where he became Superintendent of Telegraph. He continued with that company, and its successor, the Northern Pacific, until he went to the Tennessee Central.

—Mr. Andrew Gibson, Division Superintendent of the Northern Pacific, was born in Ross Shire, Scotland, June 16, 1860. He came to the United States in 1883 and the same year took a position with the Northern Pacific as a clerk to the Assistant Engineer. The following year he became chainmain, then rodman, leveller and transitman, and in 1888 was promoted to be Assistant Engineer. From then until his recent appointment (Division Superintendent), Mr. Gibson has held similar positions on different divisions. He assumed his new duties May 1, this year.

—May 13 there died in Berlin Wilhelm Streckert, who was for 28 years what we may call consulting engineer of the Imperial Railroad Commission, and as such had very much to do in securing the necessary uniformity in the railroads and the different railroad systems of the German Empire, and in their rolling stock and regulations. The constitution of the empire requires that in case of war all the railroads, with their employees, be under the direction of the imperial authorities, to be managed as one system. Endless negotiation has been necessary to secure such uniformity, and for this Streckert displayed extraordinary capacity. He was also for 24 years the President of the Berlin Railroad Science Society (Verein für Eisenbahrkunde), before which important technical railroad questions are discussed, frequently by the best authorities, and he was doubtless one of the most thoroughly informed railroad men in the world. He was a native of Cassel, and died in his 72d year.

—Mr. W. S. Morris, who has just been appointed Mechanical Engineer of the Erie Railroad, succeeding Mr. Barr, comes to the Erie from the Chesapeake & Ohio, where he has held the position of Superintendent of Motive Power, since 1893. Mr. Morris' school life was spent in the public schools of Chicago, where he was born in 1857. After completing the course at the Cook County Normal, he entered the service of the Housatonic road as a machinist apprentice. In 1879 he went to the Wabash as a machinist, later becoming fireman and engineman. He was promoted on the Wabash to the position of Assistant Master Mechanic, but soon sought other fields. For one year, 1883 to 1884, he was Master Mechanic of the Fort Wayne, Cincinnati & Louisville; and then he became Master Mechanic of the Missouri Pacific, and later for the Wabash. In July, 1889, Mr. Morris was appointed Superintendent of Motive Power and Rolling Stock of the Chicago & West Michigan and the Detroit, Lansing & Northern, which position he held until 1893, when he went to the Chesapeake & Ohio, which company he now leaves to go to the Erie. Mr. Morris is too well-known to the readers of the *Railroad Gazette* to need introduction here. He is a prominent member of both of the mechanical associations, having done valuable work on committees in both of them. In 1897 he was chosen one of the Vice-Presidents of the Master Mechanics' Association, and two years ago he was elected President of that association for the year then ensuing.



ELECTIONS AND APPOINTMENTS.

Atlanta, Knoxville & Northern.—On May 17, the headquarters of the General Manager, Traffic Manager and Secretary, Treasurer and Auditor were removed to Knoxville, Tenn.

Canadian Pacific.—G. J. Bury, heretofore Assistant General Superintendent of the Lake Superior Division, has been appointed General Superintendent of the same Division, with headquarters at North Bay.

Cleveland, Akron & Columbus.—See Pennsylvania Company.

Denver & Rio Grande.—J. Schilling has been appointed Master Mechanic, with headquarters at Alamosa, Colo., succeeding G. H. Shone, resigned.

Erie.—W. S. Morris, heretofore Superintendent of Motive Power of the Chesapeake & Ohio, with headquarters at Richmond, Va., has been appointed Mechanical Superintendent of the Erie, with headquarters at Meadville, Pa., succeeding J. N. Barr, resigned.

H. B. Crandall has, in addition to his duties as Coal Freight Agent, been appointed Fuel Agent, effective May 22.

Georgia, Florida & Alabama.—E. K. Bryan, Jr., has been appointed Traffic Manager.

Illinois Central.—H. Baker, Division Superintendent, with headquarters at Freeport, Ill., has resigned. (See Southern.)

Iowa Central.—J. A. Davis, heretofore Superintendent of the M., K. & T., has been appointed Superintendent of the I. C.

Manistique, Marquette & Northern.—This company having purchased the Manistique & Northwestern Ry., the following officers have been elected: R. R. Metheany, President; D. W. Kaufman, Vice-President and Treasurer, and B. B. Metheany, Secretary.

Milwaukee, Benton Harbor & Columbus.—A. A. Patterson, Jr., President, has resigned.

Missouri, Kansas & Texas.—J. A. Davis, Superintendent, with headquarters at Parsons, Kan., has resigned. (See Iowa Central.)

Nevada-California-Oregon.—G. S. Oliver has been appointed Chief Engineer, with headquarters at Reno, Nev., succeeding C. P. Keyser, Acting Chief Engineer.

New York Central & Hudson River.—F. W. Everett, heretofore Chief Trainmaster at Buffalo, has been appointed Assistant Superintendent, with headquarters at Syracuse, N. Y. F. S. Hunt, heretofore Chief Engineer of the St. Joseph & Grand Island, has been appointed Division Engineer of the N. Y. C. & H. R.

Pennsylvania Company.—R. C. Barnard, heretofore Engineer Maintenance of Way (Southwest System), has been appointed Superintendent of the Marietta Division (Northwest System), succeeding H. W. Thornton. Owing to ill health H. W. Byers, Superintendent of the Cleveland, Akron & Columbus, has been granted an indefinite leave of absence and Mr. Thornton, heretofore Superintendent of Marietta Division of the Pennsylvania, succeeds Mr. Byers; F. H. Worthington, Engineer Maintenance of Way, at Richmond, Ind., succeeds Mr. Barnard, and Mr. Worthington in turn is succeeded by R. Ferriday; W. D. Wiggins succeeds Mr. Ferriday as Engineer Maintenance of Way (Northwest System).

Pontiac Pacific Junction.—C. W. Spencer, General Superintendent of the Eastern and Lake Superior Divisions of the Canadian Pacific, has been appointed Vice-President and General Manager of the P. P. J. (See Canadian Pacific.)

St. Joseph & Grand Island.—F. S. Hunt, Chief Engineer, with headquarters at St. Joseph, Mo., has resigned. (See New York Central & Hudson River.)

St. Louis & Gulf.—H. J. Carpenter has been appointed General Auditor.

W. R. Powe has been appointed General Freight and Passenger Agent, with headquarters at Cape Girardeau, Mo.

St. Louis, Memphis & Southeastern.—M. W. Wambaugh has been appointed Chief Engineer and Superintendent of Construction, with headquarters at St. Louis, Mo.

Southern.—R. A. Dugan, heretofore Assistant to the President and Purchasing Agent of the Chicago, Lake Shore & Eastern, has been appointed Assistant General Manager of the Southern, with headquarters at Washington, D. C., succeeding R. B. Pegram, resigned.

H. Baker, heretofore Division Superintendent of the Illinois Central, has been appointed Division Superintendent of the Southern, with headquarters at Charlotte, N. C., succeeding C. S. McManus, who has become General Superintendent of Transportation, with headquarters at Washington, D. C., succeeding W. H. Peddle.

Texas & New Orleans.—G. C. De Young having been assigned to other service, the office of Assistant Superintendent is abolished.

Texas Midland.—D. Quill has been appointed Acting Assistant to the General Manager.

Union Pacific.—Ernest Stenger has been appointed Assistant Superintendent of the Colorado Division, succeeding Henry E. Flavin, assigned to other duties.

Wabash.—A. G. Trippeer, Resident Engineer of the Western Division, has been transferred to the Eastern Division, with headquarters at Peru, Ind., succeeding J. W. Patterson, Jr., resigned. W. W. Greenland succeeds Mr. Trippeer at Moberly, Mo.

Wrightsville & Tennille.—M. V. Mahoney has been appointed General Freight and Passenger Agent, with headquarters at Dublin, Ga., succeeding E. K. Bryan, Jr., resigned. (See Georgia, Florida & Alabama.)

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALBION & SOUTHEASTERN.—This company was incorporated in California May 7th, to build a railroad 35 miles long from the town of Albion, at the mouth of the Albion River in Mendocino County, Cal., to the town of Booneville, following the course of the Albion River. Capital stock $1,000,000. Directors: Miles Standish, P. S. Teller, and others.

ARKANSAS, MISSOURI & KANSAS.—Surveys are reported in progress for this proposed line, which was incorporated in Missouri last July. The route has not been located except that it has been decided to go northwest into Kansas and south into Arkansas. Surveys so far have been completed through Barry, Stone, Newton and Jasper counties in Missouri, and as far as Spring River in Cherokee County, Kan. W. D. Spooner, Chief Engineer.

ATLANTA & SAVANNAH AIR LINE.—It is said that application is to be made at once for a new air line route between Atlanta and Savannah, 235 miles. It is provided that the office is to be in Atlanta, and that the line will run through the Counties of Fulton, Henry, DeKalb, Rockdale, Newton, Jasper, Putnam, Baldwin, Hancock, Washington, Jefferson, Johnson, Bulloch, Effingham and Chatham. The incorporators are Wm. H. Venable, J. L. Dickey, W. L. Peel and others of Atlanta and other places.

BAGDAD MINING & MILLING CO.—A standard gage railroad is being surveyed from Ludlow, San Bernardino County, Cal., to the Bagdad Mines by the Bagdad Mining & Milling Co., for the purpose of transporting ore from the mines. Distance, about 10 miles.

BOISE-THUNDER MOUNTAIN.—Bids for the first section of this proposed line in Idaho have been asked for, covering a portion of the route between Garden Valley and Pen Basin, 40 miles. In accordance with agreements made, the citizens of Garden Valley will build eight miles of the line. Most of the work is very light, but there will be two heavy pieces, one in getting around the point of the Trail Creek, and the other just before Pen Basin is reached. The majority of the route will follow a water grade. The distance from Boise to the terminus of this section of road in Pen Basin will be 96 miles, and from there to Thunder Mountain the distance is 35 miles, making a total of 131.

BUFFALO & SUSQUEHANNA.—See Railroad News.

CANADA CENTRAL.—The bill to incorporate this line, which it is proposed to build from the French River on Georgian Bay, Lake Huron, to Jenue Cache, B. C., by way of the Yellowhead Pass, was passed by the Railroad Committee of the House of Commons. The proposed line extends practically across the continent from Lake Huron, but it is claimed that it does not intend to rival existing lines, that it will run north of Lake Winnipeg, and 50 miles north of Edmondton and Prince Albert, with a branch to Port Arthur. The incorporators are E. F. B. Johnston, of Toronto; B. W. Folger, of Kingston; Paul W. Weedner, of Detroit, Mich., and others. (Construction Supplement, March 14, 1902.)

CAPE FEAR TERMINAL.—Contract is reported let by this company to the Southport Construction Co. of Wilmington, Del., for a line between Wilmington and Southport, 30 miles. The contract price is $1,450,000, and it is understood that Southport is to be made a coal and freight terminal port.

CASTLE VALLEY.—Contract has been let to the Utah Construction Co. for the first 20 miles of this projected line in Utah, beginning at the town of Salina, and extending into the canyon. This contract covers the heaviest work on the line, including three tunnels, one of which is 2,000 ft. long.

CHICAGO, ROCK ISLAND & PACIFIC.—The charter of the Chicago, Rock Island & Gulf was filed at Austin, Texas, on May 14. The principal office of the company is at Fort Worth, and its purpose is to build and operate a railroad from Fort Worth to Galveston, passing through the counties of Tarrant, Dallas, Ellis, Navarro, Freestone, Leon, Madison, Grimes, Walker, Montgomery, Harris and Galveston, a distance of 295 miles. The capital stock of the company is $15,000,000. The incorporators are: M. A. Low, of Topeka, Kan.; J. B. Wilson, of Dallas; N. H. Lassiter, S. B. Hovey, H. B. Low, Henry C. Halloway, F. E. Deitrich, J. C. McCabe, M. V. Harris and W. G. Newby, all of Fort Worth. The road is to be operated as a part of the Rock Island system. (April 11, p. 277.)

CHOCTAW, OKLAHOMA & GULF.—The Ardmore branch from Hartshorne, Ind. T., to Ardmore, on the line of the Atchison, Topeka & Santa Fe, 116 miles distant, was opened for through traffic May 8. About 95 miles of the line was opened last April. (April 18, p. 295.)

CIMARRON & TAOS.—Final surveys are now being made for this line in New Mexico, which is projected between Maxwell City and Elizabethtown, 54 miles. The line will afford transportation to the Elizabethtown, Baldy and Red River mining districts, and it is intended to build it at once. It was incorporated last November, and right of way for the first 10 miles was reported secured last March.

COAL & COKE.—Incorporation was granted this company in West Virginia, May 14, with principal office at Elkins, to build a line from a point at or near Elkins, in Randolph County, to Glenville, in Gilman County, a distance of about 60 miles. There are a number of coal properties along the line which will be developed by the owners as soon as the road is in operation. The incorporators are Senators Henry G. Davis and Stephen B. Elkins, and others having coal interests in West Virginia.

CRESTON ELECTRIC RAILWAY, LIGHT, HEAT & POWER.—Work is reported in progress on this new line in Iowa, which was organized last March. The plans of the company include a number of electric lines in Iowa and Nebraska, but the only one being built at present extends from Creston, Union County, to Winterset, a distance of 30 miles. E. G. Baker, of Macksburg, Iowa, is President.

DENVER & SALT LAKE RAILWAY, TUNNEL & MINING.—At a recent meeting of the directors in Denver, it was voted to renew work on the tunnel through Gray's Peak in Colorado. Of this tunnel, to be 3¾ miles long, about one-half has been bored. It was formerly known as the Atlantic & Pacific or "Brick" Pomeroy tunnel. Three offers for this property are reported to have been received, but none has been accepted as yet. (April 25, p. 315.)

ELDORADO & BASTROP.—Contract for grading this new line, which was chartered in Arkansas last February, to build from a point on the Arkansas-Louisiana line in Ashley County, northwest through Ashley and Union counties, to a point near Eldorado, on the Iron Mountain, 45 miles distant, has been let to E. M. Dodson & Son, of Bastrop, La. The line will serve as an extension of the New Orleans & Northwestern, and the directors are Geo. J. Gould and others connected with the Missouri Pacific.

FAIRHAVEN & GEORGETOWN.—Incorporation was granted May 14 to a company proposing to build a steam railroad 45 miles long, from a point in Baldwin Township, Allegheny County, Pa., to a point in the Borough of Georgetown, Beaver County, Pa., a distance of 45 miles. Walter S. Reed, of Pittsburgh, President.

GRAND RIVERS & SOUTHERN.—This company was incorporated in Kentucky, May 8, to build a railroad 16

miles long, from a point on the Cumberland River opposite Rockcastle, Trigg County, to pass through the counties of Livingstone, Lyon and Trigg. The incorporators are J. W. Harrison, E. C. Simmons and I. W. Norton, of St. Louis.

Greene County.—This company was incorporated in Pennsylvania May 14, to build a road from the Borough of Washington, Washington County, Pa., to the Borough of Fayette, Greene County, a distance of 25 miles. James T. Blair, of Greenville, Pa., is President.

Iowa & Missouri.—Charter was granted in Missouri on May 16 to this company, which proposes to build from St. Louis to Macon, Mo., 150 miles. It is to be operated in connection with the Iowa & St. Louis, which see. The directors of the Iowa & Missouri are H. E. Reddig, Henry C. Solomon and others, of Kansas City.

Iowa & St. Louis.—This company became an Iowa corporation by the filing of new articles of incorporation with the Secretary of State of Iowa last week, making Centerville, Iowa, the headquarters of the company. The new articles provide for a capital stock of $900,000, and the building of a railroad from a point connecting with the Chicago & North Western near the town of Lovilia, Monroe County, Iowa, over the most practicable route in a southerly direction through Monroe and Appanoose Counties, by way of Centerville, to the northeast corner of Putnam County, Mo. The line will be about 45 miles long. The incorporators are J. D. Delaney, C. H. Varnon and J. A. Reddig. (March 28, p. 235).

Kansas City, Beatrice & Western.—Articles of incorporation were filed in Nebraska May 10, for a line organized under the laws of New Jersey, with a capital stock of $100,000. Except for the information contained in the title, it is not known where the road is to extend. Incorporators are: Wm. F. Lambert, of Philadelphia; John R. Caucher, of Reading, Pa.; O. J. Collman, of Beatrice, Neb., and others.

Kentucky Roads.—Work is reported in progress on a narrow gage line eight miles long, from a point near Jackson, along what is known as the Panhandle, to Frozen Creek. The Panhandle is a strip of land formed by a loop in the Kentucky River, where the latter runs seven miles and comes back within a few feet of itself. We are at present unable to obtain the names of interested parties.

Knoxville, La Follette & Jellico.—Contract for the section of this proposed line between La Follette and Jellico, Tenn., has been let to the Callahan Construction Co. The line was chartered last April to build from Knoxville to a connection with the Louisville & Nashville at Jellico, about 45 miles, in the interest of the Atlanta, Knoxville & Northern. (April 18, p. 296.)

Lawton & Craterville Electric.—This company has been incorporated in Oklahoma to build an electric line 15 miles long between Lawton and Craterville. T. W. Brewer, Lawton, Okla. T., is interested.

Mexican Central.—The general betterments of the line now in progress are requiring over 1,000 men at the present time. The work includes ballasting, new bridges, etc., and General Manager Nickerson announces that the entire line between Tampico and Monterey is to be ballasted with rock. Surveys are now being made for the projected line between Tampico and the City of Mexico, and it is said that work on this will begin at soon as the route is located and the survey approved by the Government. It is also stated that the line between San Pedro and Trevino is to be built at once. Grading outfits are on the ground. The threatened eruption of Mt. Colima volcano has caused a temporary stop in the extension of the Guadalajara line to the port of Manzanillo, on the Pacific Coast. The original route of this extension was close to the base of the volcano, but it has been decided to abandon this and locate one further away.

Mineola, Hempstead & Freeport Traction.—A line from Freeport to Mineola, N. Y., nine miles, has recently been completed and work is in progress between Hempstead and the New York City line, six miles. It is also proposed to build west from Freeport by way of Lynbrook to the terminus of the Kings County Elevated. An increase of the capital stock from $125,000 to $1,000,000 for this purpose has been authorized. The par value of the shares is $50 and there are no bonds outstanding. John E. Ensign, of Hempstead, is President.

Minnesota & Iowa Electric.—Articles of incorporation of this company were filed in Iowa last week. The capital stock is fixed at $500,000, and the principal place of business is Decorah, Iowa. It is proposed to build an electric railroad between Decorah, Iowa, and St. Paul, Minn., about 135 miles, air line. The road is to carry freight, baggage and mail and express as well as passengers. The officers are: President, H. R. Wells; Vice-President, R. E. Thompson; Treasurer, H. Nupson, and Secretary, S. A. Langum, all of Preston, Minn.

Missouri, Kansas & Texas.—The new lines in Oklahoma under charter of the Missouri, Kansas & Oklahoma, referred to last week as aggregating about 265 miles, will be built as follows: From Guthrie to Stevens, from Oklahoma City to a point on line No. 1 and from a point on line No. 1, in the Osage Nation, to Wybark, Ind. T. (May 16, p. 372.)

Muncie & Western.—Incorporation was granted this company on May 12 in Indiana, to build a railroad 12 miles long in Delaware County, Ind. It is designed as a connection between the Cincinnati, Richmond & Muncie and the Fort Wayne, Cincinnati & Louisville. The incorporators are Frank C. Ball, Louis A. Clark and others.

Nepigon.—This company's bill has been amended by the Railway Committee of the House of Commons to permit it to go to James Bay only. The company asks for a number of other lines to Port Arthur, Fort William, etc.

New York Central & Hudson River.—It is said that during the coming summer the Rome, Watertown & Ogdensburg will be relaid with 70-lb. rails between Richland and Crockett's, N. Y., 37 miles. Additions are also to be made to the freight yards in Oswego. The total cost of the work will be about $200,000.

Northern Pacific.—It is said that the Park Branch, in Montana, will be extended from the present terminus at Cinnabar, Park County, to Gardner, three miles southeast, on the northern boundary of the National Park.

Oleona & Germania.—This company was incorporated in Pennsylvania May 12 to build a steam railroad 10 miles long from Oleona to Germania, in Potter County. F. L. Peck, of Scranton, Pa., is President.

Pennsylvania Roads.—Surveys in the interest of C. Jutte & Co., of Pittsburgh, are reported for a new coal road from Coal Center, Pa., to coal fields owned by them in West Pike Run Township, by way of Pike Run Creek and the abandoned roadbed of the old Baltimore & Ohio Short Line.

Philadelphia & Reading.—The completion of the belt line around Reading, Pa., was celebrated May 15. This is a circuit 7½ miles long around the city, which will allow the main line to be devoted to passenger trains only. (Construction Supplement, March 14, 1902.)

Pittsburgh, Toledo & Western (Wabash).—Announcement is made of the following contractors who have been awarded sections of this new line, 62 miles long, which is to extend from the Ohio River at Mingo Junction, to Jewett, Harrison County, Ohio: C. H. Connell & Co., section 40; Togle & Francy, Allegheny, 41; W. M. Chrisholm, Pittsburgh, 42; Douglas Bros., Frederick, Md., and Williams Bros. & Morse, Cleveland, 44 and 45; P. Moran & Co., Pittsburgh, 50; Bothwell & Carson, Allegheny, 58; Walker & Rodgers, Skyesville, Md., 59. It is expected that the 12 contracts which remain to be let will be announced at once. (March 21, p. 218).

Quebec Southern.—Contracts are about to be let for the extension of this line from Sorel to Levis, Que. Proposals were asked last March for the portion of the line between Levis and St. Gregoire, in the County of Nicolet, about 70 miles, and Sorel is about 48 miles from St. Gregoire. H. A. Dodge, President of the South Shore, is President.

Santa Fe, Prescott & Phoenix.—Announcement is made that the Big Bug branch of the Bradshaw Mountain road was opened for traffic May 11. This line extends from Poland Junction, Ariz., on the Prescott & Eastern, to Poland, eight miles.

Snoqualmie-Snohomish (Electric).—Franchise has been granted for an electric line between these two points in the State of Washington, by way of Munroe. The distance is about 70 miles.

Stockton Electric.—In connection with the recent sale of four-fifths of the stock to persons represented by James H. Budd, several new interurban lines are projected. One of these is to run from Stockton to Lodi, Cal., 14 miles, and another from Stockton to Sacramento, about 50 miles. It is also proposed to spend about $100,000 in betterment of the local lines in and about Stockton.

Temiskaming & Northern.—Work was begun on this projected line from North Bay, Ont., to Thornloe, on Wabis Bay, which is an inlet of Lake Temiskaming. The total length of the line is about 100 miles, but only the first 50 miles have as yet been located. The highest elevation is a ridge across the line about 25 miles from North Bay, which is 1,250 ft. above the sea and about 600 ft. above the ordinary level. Connection will be made at the southern terminus at North Bay with the Grand Trunk and Canadian Pacific lines. Bids for clearing right of way over the first 20 miles have been called for, to be addressed to the Hon. F. R. Latchford, Minister of Public Works, Toronto, Ont. (April 11, p. 278.)

Troy & Williamstown (Electric).—An officer of the Bennington & Hoosick Valley, which has under consideration this new line between Troy, N. Y., and Williamstown, Mass., 50 miles, writes that surveys have been completed, but that the plans are not yet in such shape that detailed information can be given. Geo. E. Greene, Hoosick Falls, N. Y., is President.

Western Maryland.—It is said that surveys will be made at once for an extension from Howardville, Md., down the Gwynn's Falls Valley to tidewater.

GENERAL RAILROAD NEWS.

Atlantic Coast Line.—The proposition to absorb the Savannah, Florida & Western was agreed to by the shareholders on May 12, and they will meet again on June 16 to authorize a consolidated mortgage for $80,000,000 to secure 50-year gold bonds, rather more than half of which will be used to retire the underlying bonds of the two companies at or before maturity. The rest will be applicable for additions and betterments. The consolidation will increase the capital stock to $42,000,000 instead of $34,740,200, as at present. Of this stock $18,800,000 will be 5 per cent. preferred non-cumulative. Holders of Savannah, Florida & Western preferred stock will receive 50 per cent. of the par value of their holdings in the common stock of the new company, and holders of the common stock will receive 25 per cent. Holders who do not come in on this arrangement will be paid either in 4 per cent. mortgage bonds, or in cash, according to a valuation determined by agreement, or by the courts. The Atlantic Coast Line at present operates 1,796 miles, and the Savannah, Florida & Western 1,046.

Buffalo & Susquehanna.—Announcement is made that $4,000,000 4 per cent. non-cumulative preferred stock is to be issued, $3,000,000 of which has been sold to Fisk & Robinson, of New York, and will be issued at once, and the balance reserved for future capital requirements. It is proposed to apply these funds for extensions into the bituminous coal fields of Pennsylvania, and announcement is also made that terminals have been secured in Buffalo and that it is proposed to extend the line to this point. Coal properties near Tyler, Pa., about 30 miles south of the present terminus of the road, have also been acquired. A large part of the coal produced will find a market in the territory directly tributary to the company's lines, and the Buffalo & Susquehanna does not intend to enter the field as a competitor of any existing line. A company known as the Buffalo & Susquehanna Terminal will be organized in New York State to build the connection from Wellsville to Buffalo. The line is at present in operation from Addison, N. Y., to Sinnemahoning, Pa., with branches to Wellsville, Keating, Oleona and other points, a total of 175 miles.

Chicago, Indianapolis & Louisville.—It is now definitely stated that the Monon will come under the joint control of the Southern and the Louisville & Nashville, although official announcement with the exact terms of agreement, will not be made until next week. It is understood that a joint issue of 4 per cent. bonds will be made, secured by the Monon stock, of which there is $10,500,000 common, and $5,000,000 preferred. This, according to the *Chronicle*, will be exchanged for the new bonds on the ratio of about 77½ for the common stock, and 87½ for the preferred.

Des Moines & Fort Dodge.—Controlling interest in this property, which extends from Des Moines, Iowa, to Ruthven, Iowa, 143 miles, with trackage rights into Fort Dodge, has been secured by W. L. Stowe and E. S. Hooley, of New York. The road is now under lease to the Chicago, Rock Island & Pacific, the lease expiring in 1905. The purchasers declined to say in whose interest they are acting.

Des Moines, Iowa Falls & Northern.—First mortgage 5 per cent. gold bonds to the extent of $1,000,000 are being offered by Geo. A. Fernald & Co., of New York, at 102 and interest. The line is now under contract to the Globe Construction Co., of Chicago, from Des Moines to Iowa Falls, 76 miles, and is projected about as far again from Iowa Falls to Osage. The bonds are only issuable on five-mile sections of main track as fast as they are completed, and the bonded debt is limited to $14,000 a mile. The work on the road is now in progress.

Glasgow R. R.—This property, which is a branch of the Louisville & Nashville and runs from Glasgow, Ky., to Glasgow Junction, 10 miles, has been purchased for $100,000, by H. C. Trigg, of Glasgow. It is understood that several Louisville parties are associated with Mr. Trigg in this purchase, but their plans have not as yet been given out.

Hocking Valley.—Additional first consolidated mortgage 4½ per cent. bonds have been listed by the Stock Exchange to the extent of $1,000,000, making a total of $11,237,000. Of the proceeds of these new bonds, $401,000 are applied for new equipment and the balance for the redemption of 6 per cent. car trust bonds for additions and betterments, and for stock in the Sunday Creek Coal Co.

Louisville & Nashville.—Transfer of the Shelby R. R. to this company was filed for record May 9. The Shelby road extends from Anchorage to Shelbyville, Ky., 19 miles, and has been operated by the Louisville & Nashville under lease, earnings in excess of fixed charges going to the lessee. The price was $160,262.

Missouri, Kansas & Oklahoma.—Mortgage for $5,000,000 was filed with the Secretary of State of Oklahoma, May 14, to provide for building three lines in Oklahoma, aggregating about 250 miles, for which contracts have been recently let. The Central Trust Co. of New York is mortgagee, and the Missouri, Kansas & Texas is guarantor. An issue of 5 per cent. first mortgage 40-year gold bonds is provided for. (Railroad Construction, May 16, p. 372.)

Mobile, Jackson & Kansas City.—Purchase of the Gulf & Chicago by this company is announced. The Gulf & Chicago is a narrow gage line, which runs from Pontotoc to Middleton, Tenn., 60 miles, and it is understood that an extension of the Mobile, Jackson & Kansas City will be built to connect with the southern terminus of the newly acquired property.

New York & Pennsylvania.—This line, which extends from Canisteo, N. Y., to Shingle House, Pa., 52 miles, is to be sold under foreclosure May 24. The road is now in the hands of a receiver, George R. Brown.

Savannah, Florida & Western.—See Atlantic Coast Line.

Seaboard Air Line.—The East & West R. R., which extends from Cartersville, Ga., to Pell City, Ala., 116 miles, is reported purchased in the interest of the Seaboard Air Line. The East & West is a link in a line between Atlanta and Birmingham.

South Carolina & Georgia.—The stockholders will hold a meeting at Charleston, S. C., June 12, to vote on a proposed joint agreement to consolidate capital stocks, franchises and property of the Asheville & Spartanburg, which extends from Biltmore, N. C., to Alston, S. C., 134 miles; the South Carolina and Georgia, which extends from Charleston to Augusta, with a number of branch lines, bringing the total track operated to 418 miles; the South Carolina & Georgia Extension, which operates 182 miles, between Marion, N. C., and Camden, S. C., with a branch, and the Carolina Midland, which operates 85 miles of line between Cayce and Allendale Junction, S. C., with a branch. All of these properties except the South Carolina & Georgia Extension are operated under lease by the Southern.

Staten Island Electric.—The reorganization committee of the Staten Island Electric, the New York & Staten Island Electric, Richmond Borough, New Jersey & Staten Island Ferry, New York Investment & Improvement and Richmond County Power companies, advertises that a plan for consolidation and reorganization has been adopted and lodged with the Guaranty Trust Co. as depositary. Holders of bonds and stocks of both named companies are invited to deposit their securities with the Guaranty Trust Co., to be held under the terms of the said agreement. It was provided in the agreement that the plan should be operative when the holdings of majorities in value of the securities of these companies had been deposited. Such deposit has now been made and the committee has declared the plan operative and is now engaged in carrying it out. The committee is composed of Wm. L. Bull, R. Somers Hayes, John Greenough and Walter G. Oakman.

United Railroads of San Francisco.—Subscriptions were received in San Francisco on May 15 for first general mortgage 4 per cent. sinking fund 25-year gold bonds to the extent of $5,000,000. The price was 92¼, plus accrued interest. Provision has been made for a sinking fund which commences in 1905, and is supplied by a charge of 2 per cent. or more on the entire gross earnings, not to be less at any time than $100,000 a year, and all the income above 5 per cent. dividends on the common stock.

Wabash.—The property and franchises of the Columbia & St. Louis, which runs from Centralia, Mo., to Columbia, 22 miles, and is the successor of the Boone County & Boonville, having been operated by the Wabash for a number of years, has been purchased. The transfer is subject to two outstanding mortgages aggregating about $400,000.

Wheeling & Lake Erie.—Spitzer & Co., of New York, offer $866,000 first consolidated mortgage 4 per cent. gold bonds, due in 1949. These bonds are part of an issue of $15,000,000, under a deed of trust dated Sept. 1, 1899, to the Mercantile Trust Co., and have just been sold from the treasury of the railroad, the proceeds having been applied to extensions and improvements and additional terminal facilities. These bonds are an absolute first mortgage on 202 miles of line, and a first lien on the remaining 249, subject only to the outstanding divisional bonds, aggregating about $13,000 a mile.

Additional first consolidated mortgage 4 per cent. bonds of 1949 have been listed to the extent of $900,000. The proceeds of these were used in payment for the Janesville Belt Line for the Massillon R. R., the property of the Huron Dock Co., and for additional terminal facilities at Toledo, Cleveland, Ironville, Mingo Junction and other points.